WORK

An Illustrated Magazine of Practice and Theory

FOR ALL WORKMEN, PROFESSIONAL AND AMATEUR.

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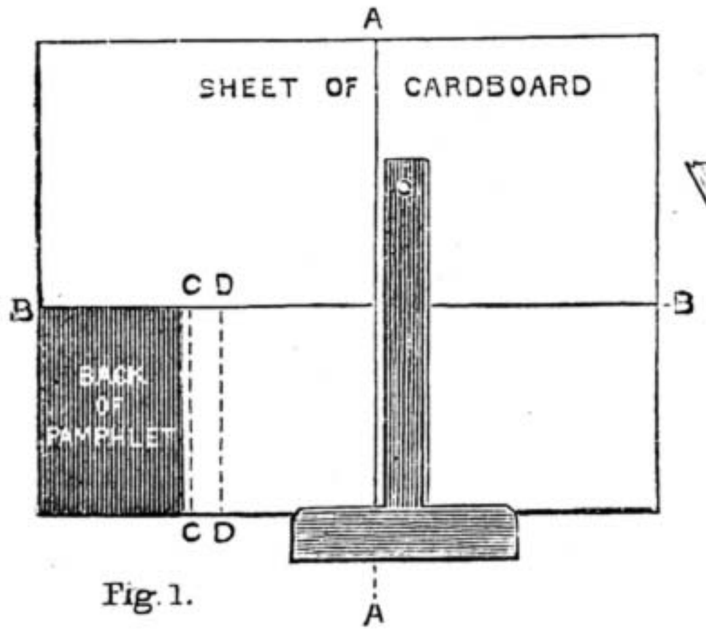

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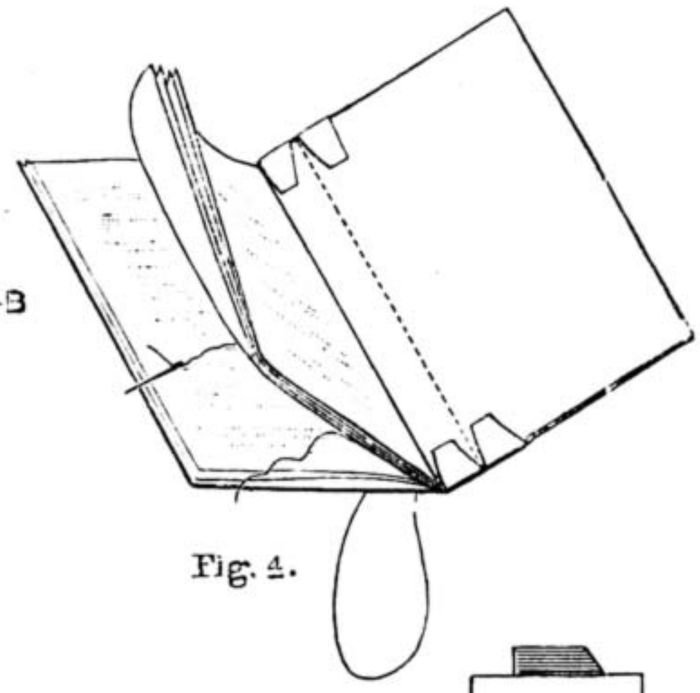

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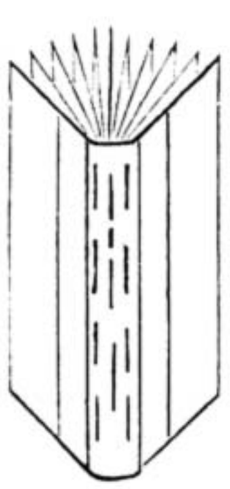

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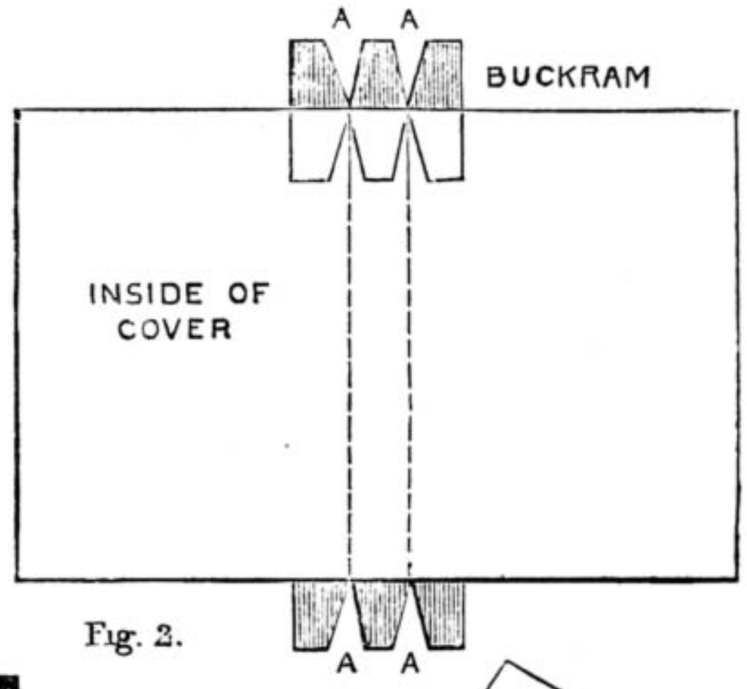

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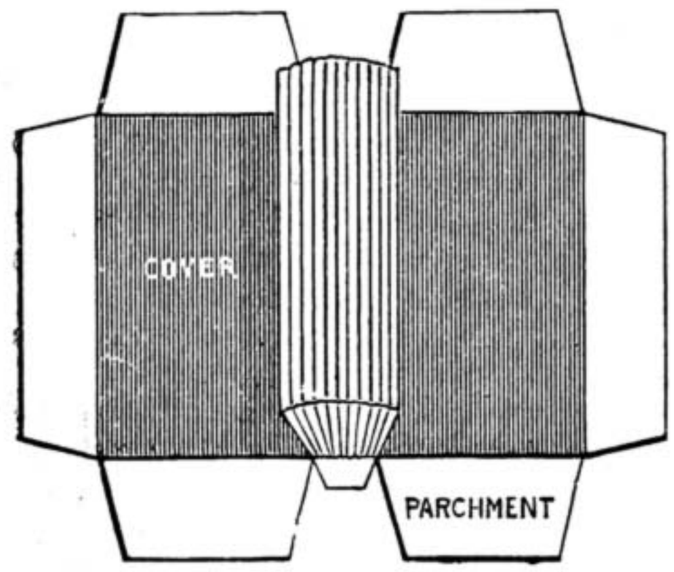

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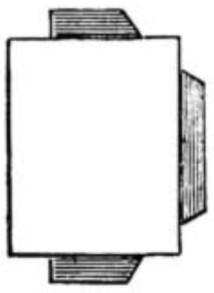

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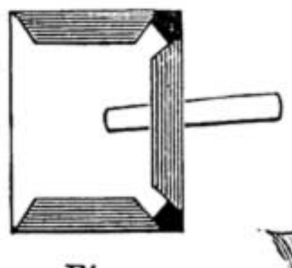

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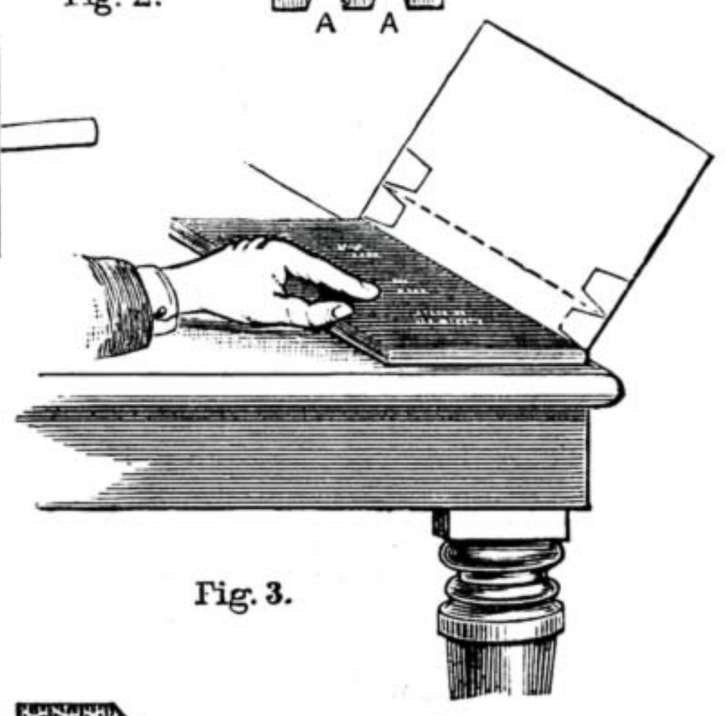

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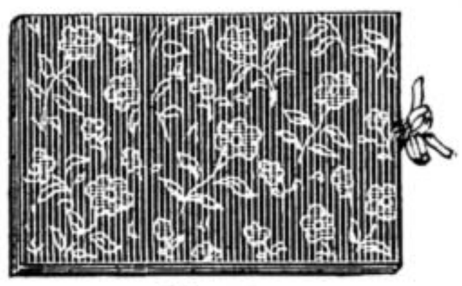

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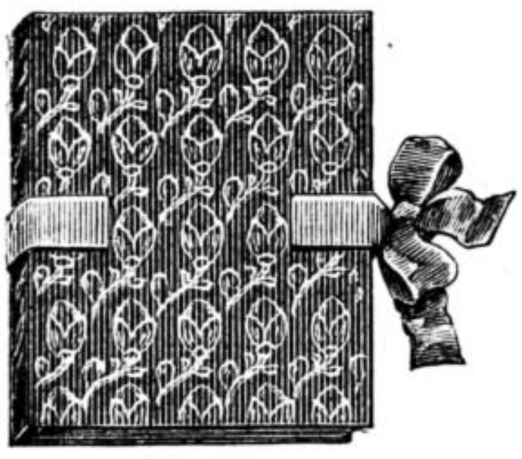
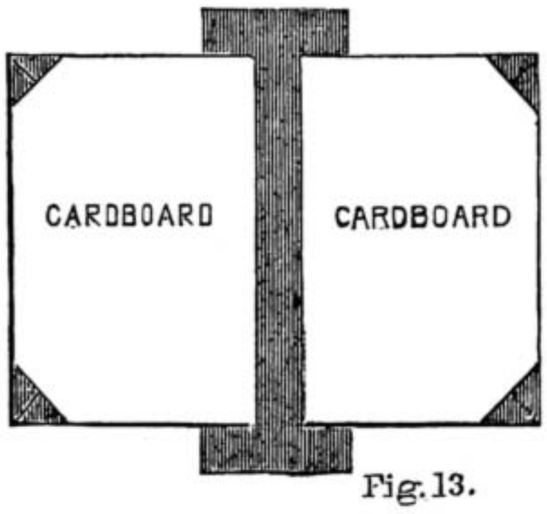


Fig. 10.

Fig 8.



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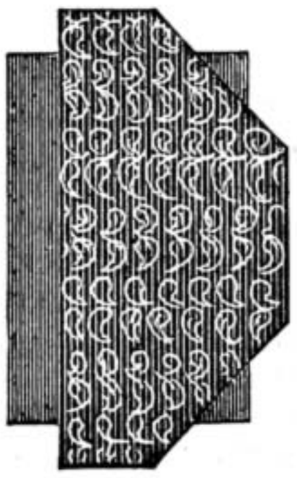

Fig. 12.

Fig. 14.

Fig. 1.—Marking Size of Pamphlet on Card. Fig. 2.—Buckram on Back of Cover. Fig. 3.—Fitting Pamphlet to Cover. Fig. 4.—Tying Thread and Stitching. Fig. 5.—Back after Stitching. Fig. 6.—Loose Cover of Vegetable Parchment. Fig. 7.—Cutting Paper for Sides. Fig. 8.—Pasting Down Corners. Fig. 9.—Paper Pasted Down and Ribbon Inserted. Fig. 10.—Ribbon Carried Round Back. Fig. 11.—Book Complete and Tied Up. Fig. 12. —Book Covered with Cretonne. Fig. 13.—Cover laid on Strip for Back. Fig. 14.—Book Labelled with Author's Name. Fig. 15.—Lettering on Back.

BINDING MADE EASY.

A CHEAP, STRONG, AND TASTEFUL METHOD OF TREATING PAMPHLETS, MUSIC, ETC.

With a Few Words on Portfolios and Blotting Books.

BY E. BONNEY STEYNE.

To hazard a guess concerning the regular contributors to this periodical, it would, probably, be safe to surmise that among the number are many professional men, experts in their own craft, who translate the technicalities of their profession into terms easily grasped by amateurs, and simplify the non-essential difficulties of the orthodox methods they are wont to employ by suggesting substitutes within the reach of unlearned people.

Also, that there are amateurs who tell the story of their own experience — the forecasts, failures, and ultimate triumph of a rough-and-ready method, evolved by themselves, to accomplish a certain aim—which, being to them good and useful, they offer as ensample to other unskilful ones to secure the desired result by unconventional ways and means.

In this paper, however, I wish to speak from the stand-point of one in the rather unusual position of having been in the first of these groups, and yet now quite in the second class. That is to say, not as an amateur who has acquired technical knowledge; but as one who, knowing the right way to achieve the end, has, by force of circumstances, entirely set it aside, and gradually evolved a makeshift, which suffices in its way.

Years since, I went through the various stages in learning the art of bookbinding, and bound unaided, at least, one volume,

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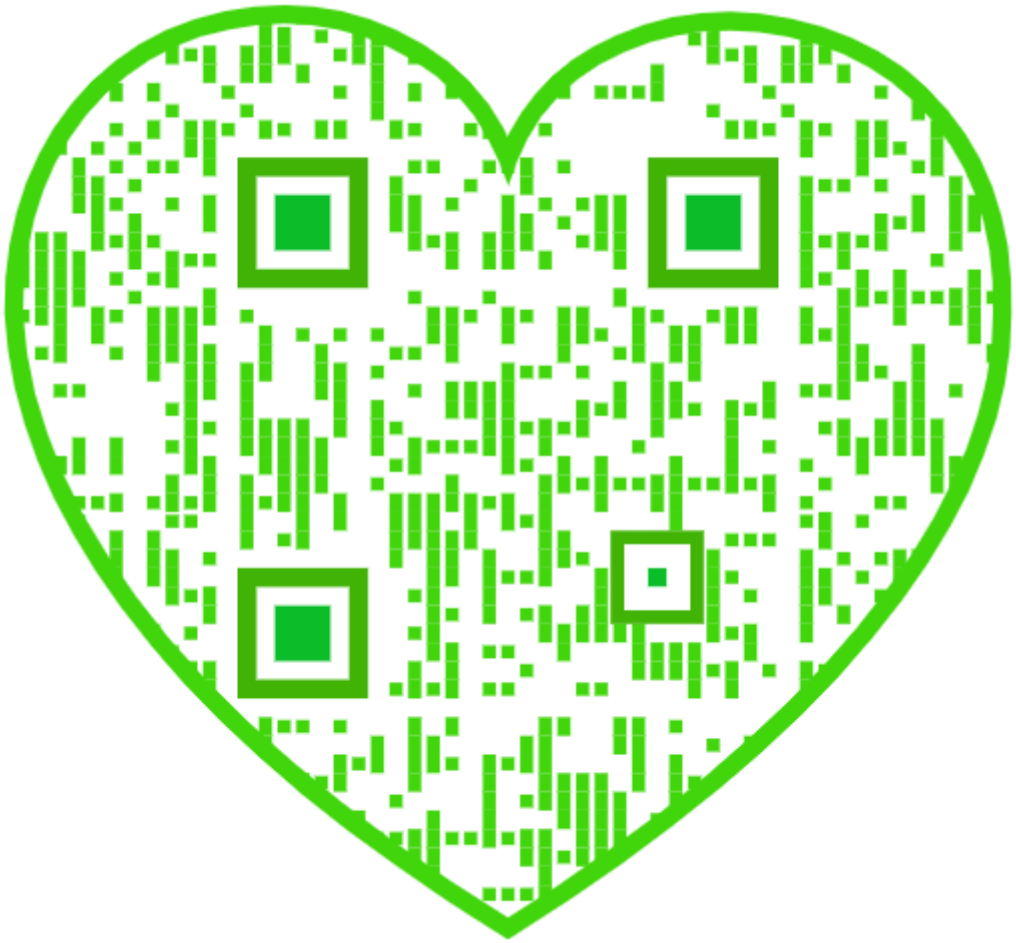

after the most strict precedents. I do not say it was a fine specimen of the craft, but it was a respectable second-rate attempt; differing only in its lack of that precise manipulation and exact finish which, at its highest, translates the trade of bookbinding to a fine art, and sets its artificers among the great names in the army of creative workers. My volume was sewn, hammered, and pressed in the routine way; it had mystic gluings to its back, slips of cardboard for the raised bands across it, edgings of coloured silk immediately at the top (the technical term for which has slipped from my memory), calf back and corners, richly tooled gilding, cloth sides, and marbled edges, after the ordinary pattern of half calf, extra bindings. This thing I did—myself—and yet I now explain a process that is makeshift and transitory, but to me (be it whispered where no professional may hear) seems really better for its particular purpose than any of the cheap and unsatisfactory bindings of the common bookbinder.

To a book lover—bibliophile is, I believe, the correct term now—the outside of a book either charms or repels one, quite apart from its contents; and from the yellow back paper novel, or the cheap cloth, with a mass of black printed lettering over it, to an inferior specimen of half morocco extra, each is unpleasant. Of course, good leather binding is far and away better than any substitute; the charm of a book well finished, be it in morocco, calf, or parchment, surpasses any inferior material; but not only are the substances costly for such work, but the time required in the process, too, adds to that cost, that it makes their use prohibitive for every-day purposes. Then, too, a cheaply printed book is ill-set in too luxurious a binding, unless the thing, by its accidental rarity, has acquired a value not its own; it gives as much disappointment to open a gorgeously bound tome, and discover the average "cheap edition" paper and ink, as it does to see an Elzevir or Aldine bound in half cloth, with marbled paper sides.

The wish to preserve in sightly fashion, clean, and handy for reference, many of the ephemeral publications of to-day, resulted in various attempts, which finally grew into a rough method of procedure, that I propose to explain fully.

This way of covering a few pamphlets, or similar publications, is not suitable for large volumes. When I want to have WORK bound I shall send it to my binder; but, with respect to that copy of Dickens' rarest tract, "Sunday under Three Heads," in facsimile, or these odd (ten or a dozen) numbers of the Browning Society Papers, or this first edition of "Called Back," and a hundred other little volumes, I bind them for myself, with great advantage. First, in saving of money, since the commonest binding costs almost as many shillings as these cost pence. Next, in perfect certainty that the thing, so bound, will be kept intact, with not only its original wrapper and uncut margin, but all its "waste" as issued (waste being the technical term for the added advertisements, wrappers, and all additions to the carcase of the book itself). Also, with the power of withdrawing any one pamphlet from the volume into which it has been stitched, or even adding a thin one or two to the already inserted group. And lastly, being able to clothe such volumes in vegetable parchment, Japanese leather paper, rich brocade, or plain brown paper, as the subjects treated, or the future use of the booklets themselves demand.

Although this expeditious and economic makeshift perfectly satisfies its contriver, yet I should have hesitated to offer it to others, had not I been so frequently asked by friends to give them a working lesson of the process. Fortified by these private demands, I have dared to address the wider circle of our readers, old and new friends as they are, although we wot not of each other's faces; and in this illustrated address, wish to speak as a fool—to fellow-fools—(after all, we are in majority, are we not?) instead of as a sage teacher to receptive pupils.

Suppose, then, that we have an imaginary pile of paper-covered books: a few of the "Book of the Words" of the Savoy Operas; two or three "Parliamentary Blue Books" of twenty or thirty pages each; a copy of "Pictures at Play"; three or four paper-covered "Cassell's National Library"; a pile of MSS. poems, written on ordinary note paper; a few specialists' pamphlets and scientific monographs; a similar heap of theological tracts. I take an actual pile by me to illustrate the various modes.

The first thing is, of course, to sort into sizes, but it is still more important, for future reference, to group into subjects. Clifford on "Atoms," and the libretto of a burlesque, may be the same size, as are three severely orthodox tracts near; but it would be a misuse of words to say there was any method in such mad grouping.

For this style of binding, the thinner, in moderation, the collected volume is the better. One inch in thickness is the most that I have accomplished successfully. More bulky volumes are loose and untidy, and in this case—thereby differing from orthodox binding—are more tedious to manipulate than the same material split into two or three volumes.

We begin, therefore, with the "Book of the Words" groups. The excellent wit and caustic satire of Mr. W. S. Gilbert are well worthy a lasting place upon one's shelves; but as he has already published a collected edition of his earlier works, we may reasonably hope for a third or fourth volume later on, and not have these bound formally. As these blue-covered pamphlets are the same size, and at present in good condition, they will be a simple first attempt. The initial step is to choose a piece of thin cheap cardboard, costing about one penny a sheet, as for these I intend to use vegetable parchment for the finishing covering. The cardboard should be white; for other materials, the common dark-blue "bonnet board," as it is called by the trade, will answer equally well.

On this card I place one of the pamphlets (Fig. 1). I mark the outline with a pencil, calculate the distance for the thickness of the back, rule a line there and then, and at equal distance rule the line for the cut. Here it may be said that all material cut with a sheet of glass underneath gives a clear edge to the cut, without the burr that is always present, if wood or cardboard is used for the table, which, with a sharp penknife, I run through the card at A, A, and B, B. At C and D I "score" the cardboard to ensure a clean fold; that is, I cut it half through with a lightly drawn knife, so that it folds without parting. Before going to the next process, it is necessary to impress the importance of judging correctly the probable thickness of the matter to be inserted in each cover. If insufficiently wide in its back, the covers will not close nicely; if too wide, the whole will be loose and untidy. As the thread for the stitching takes a certain space, it will be found that the natural thickness of a pile of pamphlets, after pressure, just when the pressure is withdrawn, will give a fairly accurate idea of the needful width.

I next cut out a piece of "ticket buckram" for the back. This is a stiff white material sold specially for ticket purposes. It costs eightpence a yard, is very wide, and fulfils its purpose so much better than any other substitute I have tried, that I should advise its use. Bookbinders' cloth or ordinary glazed calico are each possible alternatives, but neither take the paste so well, both stretching when moist, and shrinking when dry, which is not the case with the buckram; nor do they adhere so easily, or keep so firm and smooth when they are dried. For putting under parchment, the white buckram is the best, as its colour gives the vegetable parchment the look of the more costly material it imitates.

The buckram is pasted now on the outside of the cardboard; by outside I mean the side where the scoring was cut. While it is wet, cut out the gussets at A, A (see Fig. 2), or when the case is folded it will pucker at the back and disfigure it. Then turn down the buckram, and leave for awhile to dry under a light pressure, if convenient. For mucilage, I generally use the bottles of White Cross Official Paste, or Stickphast; but for any quantity it is much cheaper to use flour paste. Since, in many households, the art of making bookbinders' paste is unknown, I had better repeat it here; knowing that when, in most households, you send down an order for paste, the cook forwards a breakfast-cup of a thin drab-coloured gruel that is sloppy and wet, and peculiarly non-adhesive to the object to which it is applied, while it clings with impish vehemence to the various surrounding things it clothes, but does not adorn.

For good paste, mix a tea-cupful of flour smoothly with a very little cold water (it takes a little time to get the flour to a thick cream without lumps), then have ready sufficient *boiling* water in which a tea-spoonful of powdered alum has been dissolved, pour it gently into the basin where you have been mixing the flour, stirring it all the time, then pour back the paste into the saucepan and boil, still stirring until it gets to a thick consistency. Thus made, it is glutinous, a paste actually, not a liquid, and keeps for some weeks. It may mildew on the surface, after a time, but does not decompose. A drop of oil of cloves is often added to assist its keeping and impart a pleasant scent.

Now, the cover being dry, it is ready for filling; take it as shown in the diagram (Fig. 3); place it on the edge of the table. Take your first pamphlet. If it is composed of one set of leaves only, turn to the central one. With a large needle, and a long strong thread, pass the needle from the inside to the out, about an inch above the bottom margin of the page, and back into the centre of the book, say two inches above. Tie the loose end firmly to this as shown in Fig. 4; then running the needle out and in in wide stitches, go through the pile of pamphlets, laying each on face downwards on its predecessor until all are sewn, passing the needle at the last stitch back to the first knot, and securing the loose end.

Care should be taken to stitch each set of pages. For instance, in a weekly issue of this journal there is but one such set; in a monthly part four or five; now, to secure strength, each one must be stitched. It may happen, as in German music, that every two pages require a separate stitching, but

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if you would have the book open flat, and keep open, there is no other way to obtain it than this patient stitching of each group of pages. See, too, that the needle enters the cardboard back at the right place to exactly hit the fold of the pamphlet, not coming through the margin of the pages, some distance off this central crease. Be careful also that each successive pamphlet is pressed close down to its neighbour, and that each new line of needle holes in the back comes exactly where the thickness of the papers demands them; otherwise, the book will be loose and flap in its covers, showing the bare cardboard back when opened between the pamphlets, which it does not do if these hints are obeyed. This sewing is all important; if some of the pamphlets are likely to be wanted loose at any time, fasten each one separately, starting with a loose thread, and tying the ends once to each pamphlet. Then any one may be withdrawn and replaced by another without loosening its neighbours.

This sewing is very hard to describe, but very easy to do, and most important of all the stages of the process. In the cheap binding of to-day, the faulty sewing is the chief annoyance; either the thread used is rotten, or some carelessness in the work must occur, since nothing is more common, even in high-priced volumes, than to find a group of pages suddenly come loose, to the danger of their loss and disfigurement of the volume.

The use of the buckram back is now seen; it not only keeps the covers in their place with a strong joint to each, but also strengthens the back, for stitches into the bare cardboard would quickly tear away from their holding and render all the labour fruitless.

It is best to bind these loose pamphlets while they are in good condition, and to make a special point of this, taking occasional "wet days," or odd half hours, to overhaul their constantly accumulating mass, and bind a few volumes at a time, *before* they imperatively demand it. That is the secret of success in this home-binding; not to wait until loose pages, dog's-eared leaves, and torn wrappers insist upon being repaired, but to tackle the work while the pamphlet is yet clean, fresh, and tidy, and so prevent all these disfigurements. Then, with ordinary care in after use, they keep as fresh as the pages of a well-bound book, besides opening easily for use.

That they may open easily, it is well to use a thin cardboard. In my anxiety to obtain solid covers, I tried first very stiff cardboard. Not to recall the unspeakable agonies of stitching through a mighty piece of pasteboard, miscalculating the force, and pricking my fingers as often as the paper, when the whole was done, the volume would not keep open easily, and was not half so pleasant to handle as the flexible covers when thin card is used.

The cardboard case now will be somewhat unsightly, since it will have long stitches irregularly marking the buckram back, as in Fig. 5, and a very unfinished look about the sides.

It is best at this stage to rub a little paste along the thread at the back, working the brush under the stitches somewhat, so that the thread is well pasted down to the buckram.

For covering, there are several courses open, but vegetable parchment gives the best effect on the whole. To my own books I have almost invariably applied it, and find people generally prefer it to any other style.

The vegetable parchment is made in many qualities, and differs in thickness and appearance no less than in price. I have been charged so many different prices for this material that I hesitate to quote either. The sheets are a good size, cutting into at least four pieces for ordinary octavo books. As a rule, twopence to threepence the sheet would be probably the average cost. It is somewhat difficult to obtain. I have bought it of stationers and of chemists, and expect the various stores keep it on their list. But do not be tempted to adopt the thin cheap sort in spite of its price. It has a tendency to "cockle," it tears, and is generally unpleasant to use. This material defies pasting; it either refuses to stick, or if so, shrinks and curls up the cardboard on which it is mounted, and loses almost completely its skin-like appearance, looking like ordinary whity-brown paper.

But if cut as a loose cover, after the form shown in diagram (Fig. 6), and turned over firmly, the edges being creased down with a bone paper-knife, it keeps its place without any further fastening; but the turn-over must be left at least two inches wide to ensure this result.

It is best to fit the parchment to its place, and then remove it for lettering. I have tried gold ink, with only moderate success; probably gold size, with either bronze powder or gold leaf, would give a more workmanlike result. But gold lettering challenges directly the effect of the genuine impressed lettering on an ordinary leather-bound book, and fails dismally to equal it. Therefore, it seems best to be content with black letters and ornaments. In this, as indeed for all and every ornamental design or drawing, I use, not ink, nor Indian ink, but Stephens's ebony wood-stain. When an artist friend recommended this to me, he said, "that tip is well worth a guinea;" and his words did not exaggerate the case. If it were needful to pay a guinea, rather than forego the use of this excellent fluid, I would willingly do so. It flows freely, and gives a solid photographic black surface, as even and rich as the best impression by letterpress or lithography. Being black (not merely dark purple, like ordinary writing ink) it photographs satisfactorily, and is used by all who know of it for pen and ink work intended for reproduction by any of the numerous processes which supply a direct facsimile block for printing duplicates in any size of the original drawing.

There is a very fair imitation of leather known as leatherette that is good for some work, but possibly from the technical knowledge of consistent treatment of the material, I dislike any attempt to get the appearance of a leather-bound book without the inherent quality of lasting strength which the real material implies, and devoid of the artistic excellence of workmanship that it deserves. A really well-bound book is as much worthy of admiration as a finely inlaid cabinet or cunningly chased goblet. In no decorative art is there more need for intense care and manipulative dexterity, combined with true artistic knowledge, than in binding. The limit where beautiful design passes into vulgar ornament is keenly felt in this art. The true artist needs a complete repression of all meaner ends. No mere dexterous handling of his tools for display alone; fitness, as well as graceful design, is needed to make a good binding. A panel, gorgeous in itself, may be a poor book cover, and the more one studies the works of such men as Eve, Pasdeloup, Grolier, or Roger Payne, of older times, or of Zaehnsdorf to-day, the more we realise what a fine art it really can become. For most purposes in this home-binding, a few black lines, the title and the author's name, suffice. A book collector likes the imprint of the tome and the date at the foot on the back. It is handy for easy identification to have the title repeated in the right-hand corner of the side, as in Fig. 14, while the signature of the owner, somewhere outside the cover, may be made decorative as well as useful; for if a book, or umbrella, bears "its owner's" name conspicuously, it assists weak memories to return each to its rightful owner, and saves weak consciences hours of bitter misery, which, if vice be its own punishment, they must certainly suffer in secret, although we never, *never* see any trace of the hidden guilt.

But although sham leather is unsatisfactory, yet a substitute, in place of a richer material, is not necessarily bad. A pewter dish, in its way, may be infinitely better art than a poor design in electro-plate. The nineteenth century has been characterised as an age of shams, and, therefore, we need not to-day add to its heavy list of sins by suggesting imitative falsities in leather. There is, however, a paper leather of real Japanese make, so perfect in its colour, grain, and substance, that it would deceive even the elect, but it is rather thick and clumsy for an amateur to use, and when pasted, loses much of its beauty. The Japanese gold leather-paper is a totally different thing; for certain books it has a splendid effect, and used in one particular way, to be noticed later, it yields a novel and rich cover, in no way imitating anything we are accustomed to see in bindings.

In place of the vegetable parchment, a small printed cretonne, or some of the dainty cotton stuffs, with an all-over pattern, after the style of old chintz and the Liberty printed fabrics, look extremely well. But if the volume is thick enough to afford space for a label with title on the back, it is rather difficult to write one sufficiently neatly. It sometimes happens that the cover supplies a slip, which may be cut out and mounted for title, but this should be only resorted to in the case of really valueless books.

But here the exigences of space, as inexorable, after its fashion, as Time and Tide, compel me to reserve what I have yet to say for a future occasion, when I shall be able to explain the import of the remaining diagrams to which I am not able to call attention now.

(*To be continued.*)

A HOME-MADE WINDOW CORNICE.

BY OLLA PODRIDA.

HANGING CURTAINS—UNDESIRABLE METHODS—POLE AND RINGS—CORNICE—PLAN AND ELEVATION—ROD FOR CURTAIN RINGS—DIMENSIONS OF MEMBERS—MEMBERS IN DETAIL—PREPARATION OF UPPER MEMBERS—LENGTH—WORKING OF MEMBERS—GAUGE OR TEMPLATE—MITRING—FITTING TOGETHER—CUTTING DROPS IN LOWER MEMBERS—GLUING UP AND SCREWING TOGETHER—CORNER PIECES—PENDANTS—SUPPORTS—FINISHING.

THE methods adopted in hanging window curtains are varied, and generally—not always—in accordance with means and circumstances. A simple and cheap, but—to the curtains—destructive, means is found in the humble nail and domestic tack.

A treacherous improvement on this primitive method is attained by threading the curtains on tape stretched between a pair of nails, one at each corner, and supported by

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a third nail in the middle. Either of these methods, when viewed from the exterior, or the street, leaves little or nothing to be desired in appearance, but seen from within, and the other side of the question raised, the most unprejudiced eye must admit that the effect is—well, rather bare, and that simplicity does not, at any rate in this case, possess much charm.

The height of ambition is reached, in other cases, by means of the antiquated window pole with clumsy rings in its unprogressive descent and guise of a family heirloom from generation to generation. But, putting this on one side, it must be admitted that the *ne plus ultra* of grandeur is attained when the best front room curtains flow gracefully from a fountain head of gorgeous gilding or cunningly carved handiwork—to wit, a cornice.

Now, it is not everybody that can afford such expensive ornaments, and they are expensive unless satisfaction is obtained from a common article probably not worth half the outlay. The question therefore resolves itself into this, either to do without such or manufacture them yourself. Speaking from experience, I support the latter alternative. It is easily done, and of this I hope you will be convinced after perusing the instructions herein. It will not by any means be found a complicated subject, but the appearance is good, and even if it does not please the more critical friends, you can stop the mouths of fault-finders by informing them that you made it all yourself, and your generous disposition will doubtless lead you to add something nice about WORK.

Fig. 3 shows the cornice in elevation complete as seen from the front. Fig. 4 is a plan of the same looking down upon the top of it, showing the distance it stands out from the wall—this is a matter of taste or choice—and the position of the rod, R, for carrying the curtain rings. This rod is a plain round piece of wood, $1\frac{1}{2}$ inches in diameter, cut to fit between the upper end members, G, G, and notched or cut away at its ends so as to fit flatly and firmly on the second members, H, H; it is further secured at each end by small dowels or French nails, fitted so as to permit of its being easily unshipped if required. The length of the cornice is governed by the extreme width of moulding around the window frame or recess. This length is determined between the inside of the lower members at the ends, as shown by the arrows in Fig, 4, and it should be a couple of inches wider than the moulding referred to. The example in Figs. 3 and 4 is drawn to a scale of $\frac{3}{4}$ of an inch to the foot, and is suitable for a window recess 5 feet 8 inches over the moulding, thereby giving 2 inches clear each end. By thus spreading it slightly the appearance of a narrow window is greatly enhanced.

Fig. 1 is a half-sized section of the cornice, showing clearly the method of putting the various members together. Fig. 2 is a part front elevation at one end, and drawn to the same scale. Figs. 1 and 2 contain all the information necessary in building the cornice, except for the length and depth from the wall. The former is, as previously observed, governed by circumstances, and the latter is arbitrary. In the example under discussion, the length at the starting point between the arrows in Fig. 4 will be taken as 6 feet, and the depth or distance which it stands out from the wall as 9 inches. The dimensions in section of the various members are as follows:—A, the upper front member; G, G, the upper end members; B, the second front; and H, H, the second end members, are all 2 inches wide by $\frac{1}{2}$ inch thick, finished; stuff required, $2\frac{1}{8}$ by $\frac{5}{8}$ inch thick in the rough for these. The principal members, C in front, and J, J, at the ends, are formed out of stuff $4\frac{7}{8}$ inches wide by $1\frac{3}{4}$ inches thick. The lower members, D, D, and E E E, in which the ornamental drops are formed, are $4\frac{1}{4}$ inches wide by $\frac{1}{2}$ inch thick; F, F, are merely filling pieces $\frac{3}{4}$ inch square, and assist the mitre joints in lower members, D, D, as well as forming accommodation for the turned pendants or drops, P, P. The next thing to be obtained is the lengths of the various members. This, although at first sight, perhaps, confusing, is really very simple. Starting with the assumption that the inside distance by the arrows is 6 feet, it will readily be seen that the length of the front lower member, D, must be 6 feet 1 inch to cover the end members, E, E, which are each $\frac{1}{2}$ inch. D being settled, we find next the length of C, and this is done by adding to D twice the extreme amount by which C projects at one end; referring to Fig. 2, we find this to be $3\frac{1}{2}$ inches, which doubled amounts to 7 inches, and added to the length of D gives 6 feet 8 inches for C. The same remarks apply to B and A, and these are found to be respectively 6 feet 9 inches and 6 feet 10 inches long when finished. After what has been said the lengths of the end members should be found easily, but it may be as well to give them here. For *both* ends, E will be 19 inches, J, 26 inches, H, 27 inches, and G, 28 inches. A margin should be allowed on all the foregoing lengths to guard against accidents in mitring and fitting the joints.

The preparation of the two upper members and blanks for the lower members is a simple matter, and scarcely calls for any remark, except that each must be gauged carefully to uniform thickness with the edges, straight, especially on the front. The rounded or beaded members, B, B, and H, H, can be readily formed with a smoothing plane and finished with glass paper.

The working of the principal members, C and J, will involve the most labour. As already

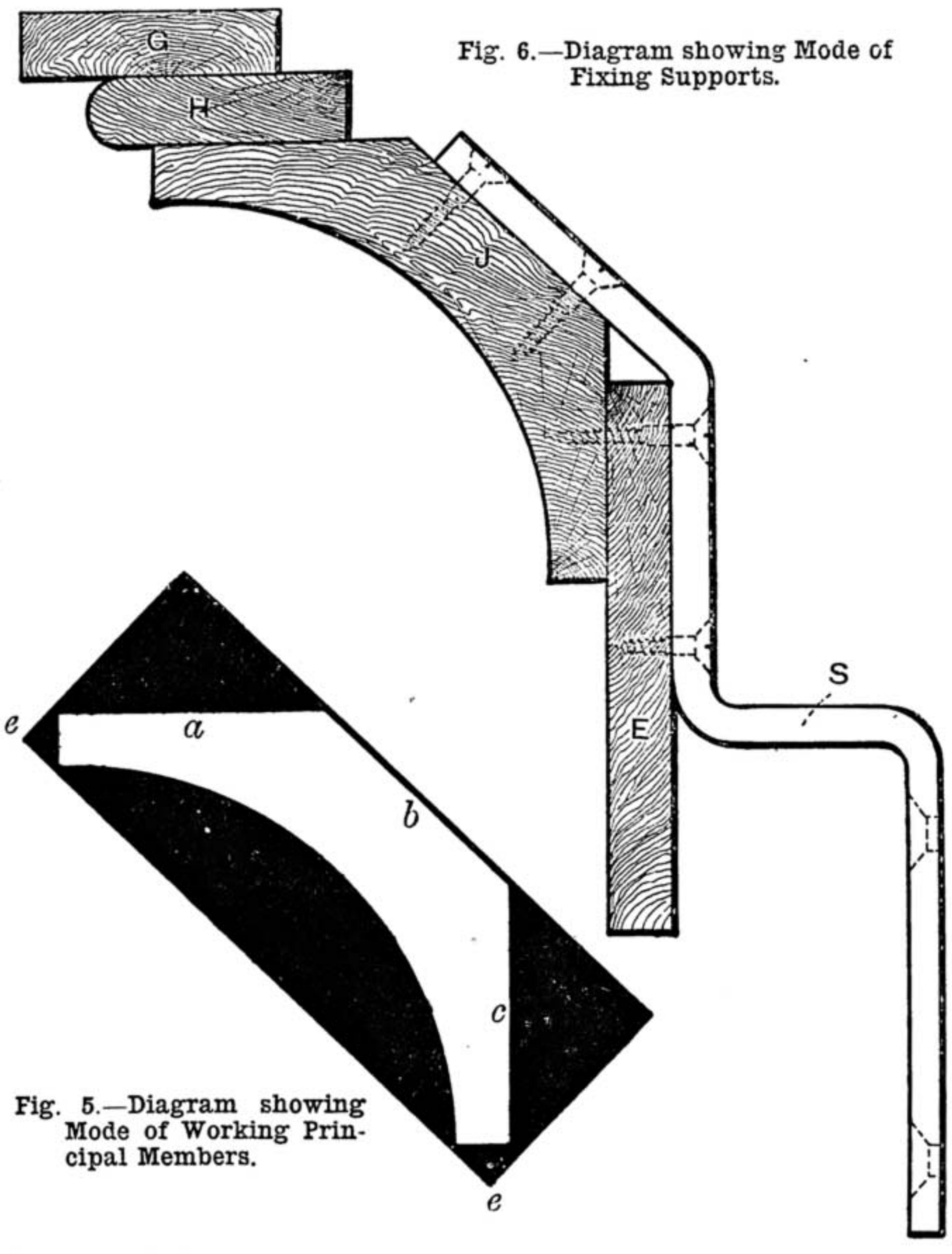

Fig. 5.—Diagram showing Mode of Working Principal Members.

Fig. 6.—Diagram showing Mode of Fixing Supports.

Fig. 3.

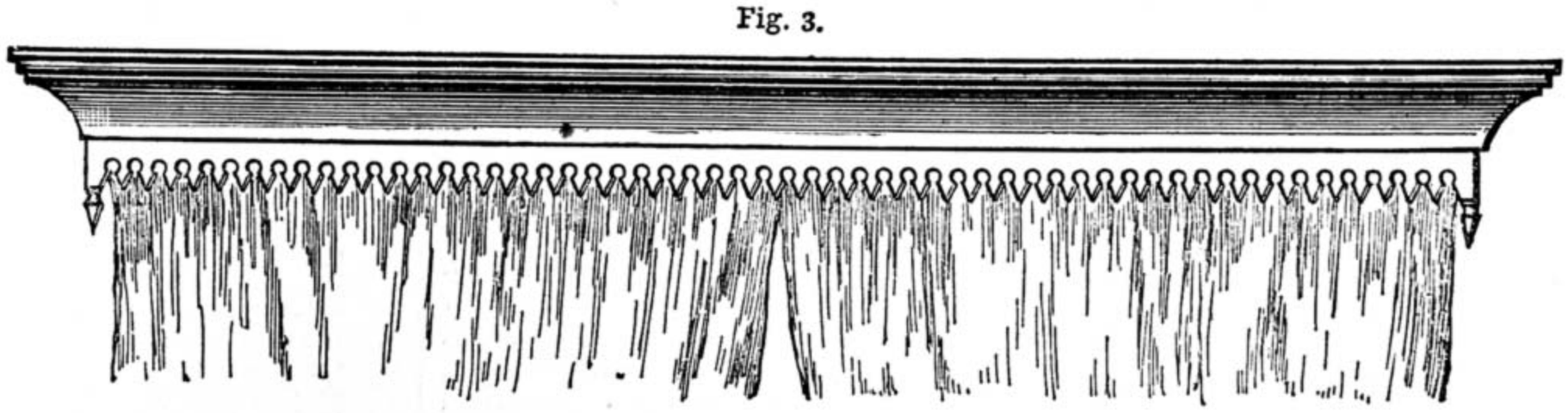

Fig. 3.—Elevation of Cornice Complete, as seen from Front.

Fig. 4.

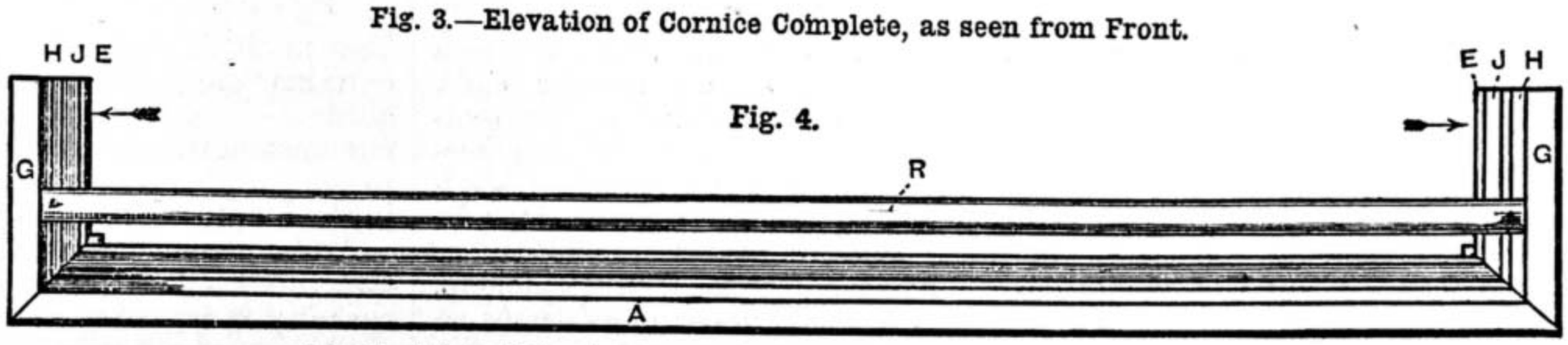

Fig. 4.—Plan of Cornice as viewed from above, with Rod in Position.

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stated, these are obtained from stuff 4⅞ inches wide by 1¾ inches thick. The method of working these out will be comprehended on reference to Fig. 5, in which the parts to be cut away are shown in black and the finished article in white. In commencing these the stuff should first be planed up straight and square to the outside sizes, and the outline marked on the ends, which must be trimmed to admit of this being clearly done. One of the sides, say that at *a*, must first be formed and carefully planed to an angle of 45 degrees, or strictly speaking 135 degrees with the back, *b*. This done, the other side, *c*, must be treated likewise, and worked square to *a*. The edges at *e*, *e*, are next planed square to *a* and *c* and the thickness gauged to ⅜ of an inch for guidance in forming the hollow part. This latter is accomplished by first roughing out the bulk with a suitable-sized gouge, and finishing with a round-nosed plane and glass paper. Care must be exercised in gouging, and the grain of the stuff studied in order to avoid detrimental splintering or "spalling." The same caution applies to the using of the plane, the "rounding" of which should be to a much lesser radius than the required hollow, it being much better and easier to work out in shavings; besides, a round nose does not work freely when buried to the full depth of the iron. A male gauge or templet made to the radius of the hollow, and with projections to meet the edges, *e*, *e*, when down to the right depth, will be found of great value for checking the progress of the work in gauging and planing, and also in ensuring similarity between C and the end pieces, J, J.

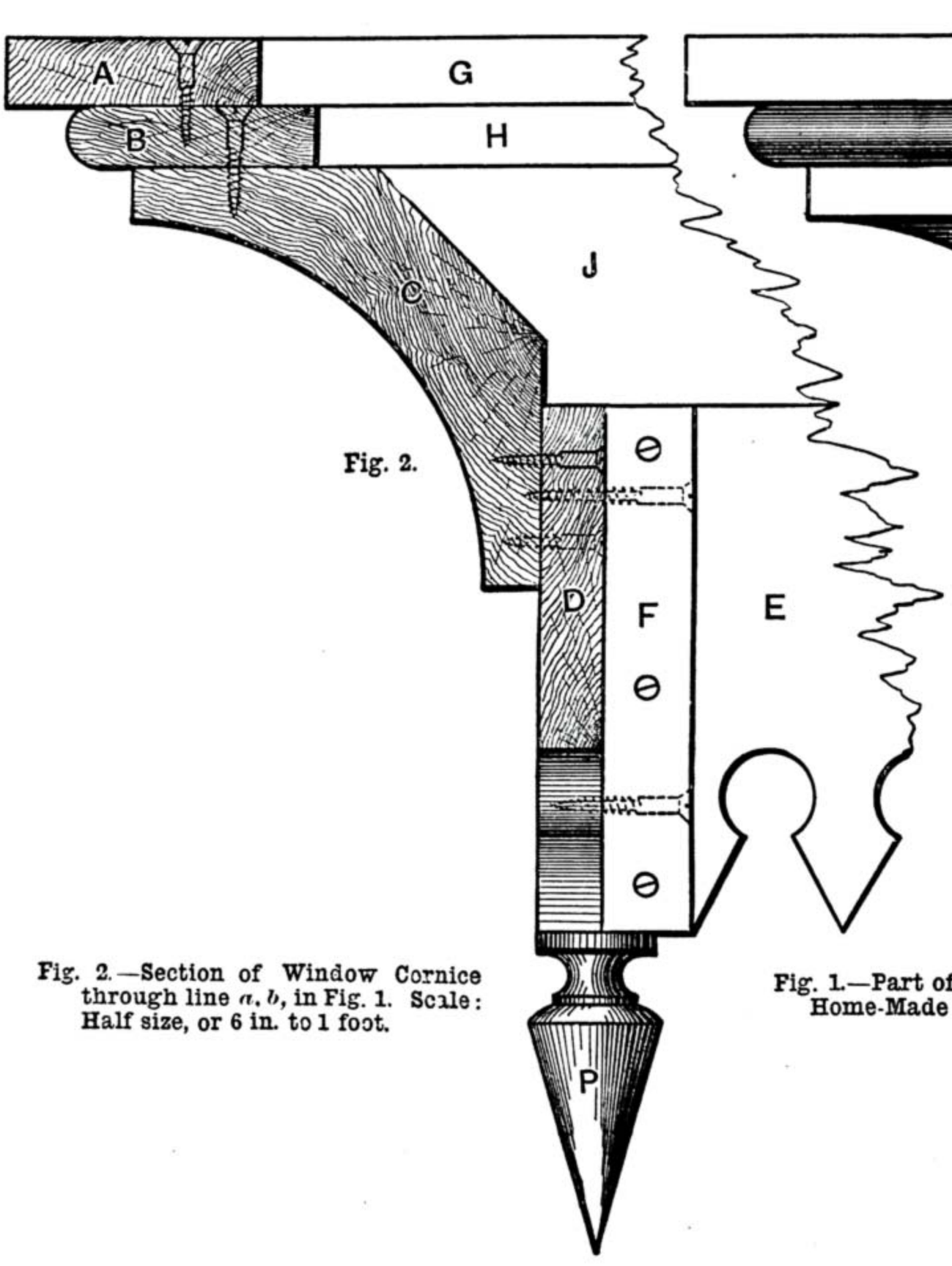

Fig. 2.

Fig. 2.—Section of Window Cornice through line *a*, *b*, in Fig. 1. Scale: Half size, or 6 in. to 1 foot.

Before putting the members of the front together, it will be an after advantage to mitre one end of each with the saw; but before doing this their relation must be noted, so that when put together the ends so treated shall mate and match. The end members will be likewise treated, but the square ends of these which butt against the wall must be left till the last. The various members in each part—front and ends—may now be screwed together, as shown in Fig. 1, bearing in mind that the lower member, D, need only be fixed temporarily on account of its having yet to be cut into a pattern on the lower edge. In mitring and fitting the ends and front together, the parts should be laid upside down on a level table or bench, and compared with adjustment by planing until they match accurately in the joint. Any trifling inaccuracies in matching of the members can be mutually adjusted after being finally put together. The mitring of the remaining front end will be materially assisted by measurements off one of the finished ends.

After the parts have been fitted together, the bottom members must be removed for cutting out the "drops." This is done by boring with a sharp bit a number of ¾-inch holes, one inch from the lower edge and about 1¼ inch from centre to centre; but the centres must be marked out first to ensure their coming right at each end. This having been ascertained, the diamond portion must be marked by means of a bevel to ensure similitude. The holes are then to be bored, and starting from one end, each space between the drops must be sawn out with a fine tenon saw, and finished with a sharp chisel. Care must be taken to avoid breaking any of them, but should this occur they can be glued back again. The "drops" in the ends need not be cut into the wall. After cutting out, the members must be carefully replaced.

The front and ends must be glued together at the mitres, and further assisted by means of French nails or slight screws where practicable. If these auxiliary fastenings are used—and they should be as provision against damp—they must be driven in the ends and not from the front. The cornice must be laid upside down on a level surface for gluing, same as in fitting the mitres, and one end only at a time must be treated. Care must be taken to get the ends fair with each other without twist. The corner pieces, F, are next glued or, better still, screwed in place as shown. The pendant, P, is a simple piece of turning, and is not permanently fixed, but merely a hand-fit, so as to be easily removed. After the glue has set properly and the joints been secured, the wall ends must be squared and the supports fitted, as shown in Fig. 6 at s. These supports are simply strips of iron ⅞ or 1 inch by 3/16 or ¼ inch thick, bent to shape, and screwed to the cornice and the projecting moulding around window. It may be found necessary to modify the support, and if there is no moulding or framework, pieces of wood about 1¼ inch thick may be fitted to the inside and under lower member of cornice and securely nailed to the wall, the cornice being afterwards shipped in and secured by screws.

The finish of the cornice is a matter of taste. I stained one of mine in imitation

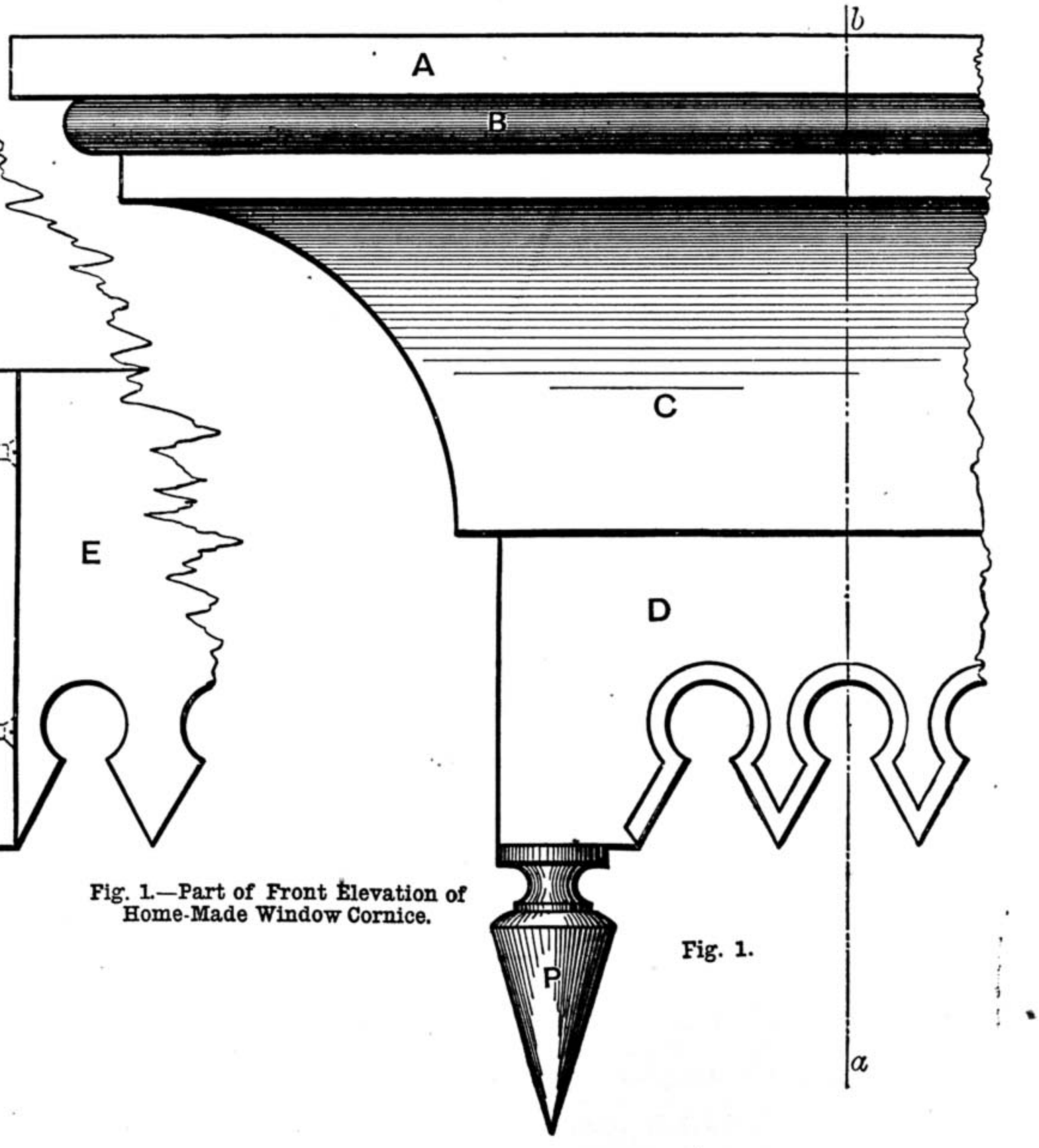

Fig. 1.

Fig. 1.—Part of Front Elevation of Home-Made Window Cornice.

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rosewood, and when sized and varnished it looked almost as well as another which I painted in French grey and gilded the edges of the upper member, upper edge of the hollow moulding, and also a border round the open work in the lower member as indicated in Fig. 2. The inside edges of the open work were painted a warm brown, which might very well have taken the place of the gold leaf on the other parts. The conical portion of the pendants at the corners was also gilded.

I may add that in the case of a long heavy cornice of this description, and especially if it stands out far from the wall, it may be necessary to fit a stay or tie at the centre on the top to assist the supports in carrying heavy curtains or resisting juvenile larks.

In concluding this paper, it is hoped that the instructions therein will be easily understood, and that the matter will be of value to some at least of the *numerous* amateur workmen who read WORK. I am inclined to hope, too, that they will not be without their value to many professional workmen who may find a little job of this kind put into their hands when, perhaps, they may least expect it. If no other advantage accrues to them from the article itself, they will at least be able to show the drawings to any householder who may require a window cornice, and so give them a better idea of how the work will look when done than they could gather from mere words.

TONING PHOTOGRAPHS WITHOUT GOLD.

BY L. IVOR POOLE.

No photographer need be told that the recognised chemical for toning photographs is chloride of gold. Turn to whatever formula we may for the preparation of a toning solution we find that this in 15 grain quantity is the main ingredient. Those who are well up in the art may be aware that platinum, or rather some salt of this metal, may be used instead, but it seems to be regarded rather as a scientific curiosity than within the range of practical photography. So far as cost is concerned platinum compared with gold may be said to be out of the frying-pan into the fire. It must be admitted that the toning bath is an expensive item in the photographer's requirements.

Then again there is the liability to which it is constantly exposed of destruction by contact with hypo. If we have not practically experienced this through some temporary carelessness or slovenliness in handling our chemicals, most of us have, in our preliminary reading or teaching, been almost nauseated with the oft-repeated caution that the "smallest trace of hypo," etc. We all know how it runs. Further, there are in toning two operations involved, not to mention the intermediate washing between toning and fixing. If one can be made to answer it would be more convenient.

Now I don't profess to be well up in photography, but merely an amateur among many who are both better operators and more scientific in their aims. I know the general run of things and the difficulties which beset people like myself in riding their hobby. It was therefore with some surprise that I heard one day of something neither gold nor platinum which would do as a basis for toning solutions, and that by the use of this, to me then unknown, stuff, (as a toning medium) toning and fixing might be done together. Of course it is known that a combined toning and fixing bath may be prepared even when gold is used, but so far as I was concerned, the notion that common acetate or sugar of lead might be substituted for chloride of gold was an altogether new and welcome idea. As a matter of fact it was known in the early days of photography, but from inquiry among friends I am convinced that it has been so far forgotten that to the host of amateurs whom dry plates have produced acetate of lead as a toner will be regarded as a novelty. I don't want to affirm that it is as good a toner as gold, although a varied range of tone can be got with it; and, speaking for myself, I have no fault to find with it, but it may be said that few will object to be told about it. The knowledge may be convenient occasionally, and possibly those who have leisure to experiment may be able to improve its powers and produce better results with it than in former times. That prints toned with it and fixed with hypo at the same time are at least as permanent as those treated in the ordinary way, can be shown. My own trials have certainly not been sufficiently extended to enable me to vouch for this personally, but I am credibly informed that a local photographer, one of the pioneers in the art, has some prints which are now as vivid as when they were made some thirty years ago. To him, indirectly, I am indebted for the formula which was given me thus: Acetate of lead, ½ oz., hypo, 4 oz., dissolved in 1 pint water, and mixed. Simple and cheap enough, surely.

The best way to prepare the combined toning and fixing bath seems to be as follows: Dissolve the chemicals separately in about half the water to each. Warm water is best for the lead. Then mix, being careful to pour the lead solution into the hypo, and not the reverse. The mixture is then ready for use. The prints are washed in the ordinary way, and treated exactly as if the gold toning bath were being used. Almost immediately, owing to the hypo acting more rapidly than the lead, the prints will assume the peculiar colour caused by hypo alone, but they will gradually "tone" down through the various shades of chocolate to purplish-black or grey. The time required is a good deal longer than with the gold toning bath I use, but not so long as first toning, then washing, and finally fixing. As the formula given is very strong, comparatively, in hypo, which seems to act on the print the whole time simultaneously with the lead, it stands to reason that the photograph must be deeply printed to allow for the prolonged action of the hypo; and I may say that lately I have been trying the effect with half the quantity, viz., 2 oz. of hypo to ½ oz. of the acetate, with improved results. With the smaller quantity of hypo the reducing action of the bath is not so vigorous, and consequently the toning may be prolonged without detriment to the print.

The solution may be used over and over again till the lead is exhausted. I am not, however, prepared to say that it will keep indefinitely, for even if not used it seems to lose strength for toning purposes. It will, however, keep for a considerable time, and by having the solutions in separate bottles and mixing them when necessary for use, the bath can always be kept up to toning strength.

It will, I hope, be remembered that these notes are not written with any intention of persuading photographers that lead is better than gold for toning. It may or may not be, but it is at any rate an alternative, and a cheap one, obtainable from any chemist at 1d. per ounce—at least, that is what I pay for it. The cost, therefore, need not be an impediment in the way of any one wishing to experiment with this new old toner. Whether the fact of lead being usable instead of gold has ever been published before I know not, but I may say that I have not seen it mentioned in any handbook on photography, of which I have read a good many, and it is certainly not acknowledged among the standard formulæ of the craft. It will not, on that account, however, I trust, be less acceptable to readers of WORK, and if I, as one of many of those who admire this periodical as being unique, may venture on a suggestion, it is that any one who knows of anything useful should not keep it to himself, but send on word about it. Much valuable information can be acquired by this means, even though the subject is not treated from a more scientific standpoint than these few hints on lead toning.

NOTES FOR ELECTRO-PLATERS.

BY GEORGE EDWINSON BONNEY.

III.—AMALGAM—AMALGAMATION: AMALGAMATE—AMALGAMATING SALT—AMMONIA—AMMONIUM—AMMONIUM CARBONATE—AMMONIUM CHLORIDE—AMMONIUM NITRATE—AMMONIUM SULPHATE.

Amalgam.—When mercury is alloyed with another metal the mixture is named an amalgam. For details relating to amalgam, see under head of *Mercury*.

Amalgamation: Amalgamate.—To combine mercury with other metals. The process of amalgamation is carried on in gold mining, where the fine gold dust is caught in troughs filled with mercury, and this metal afterwards recovered from the amalgam by distillation. The word is generally applied by electro-platers to the process of covering zinc battery plates, cylinders, and rods with mercury preparatory to their use, for the purpose of protecting their surfaces from the action of the exciting solutions when the battery is at rest. The process of amalgamating zinc is, briefly—first clean the zinc from all traces of grease and dirt; next dip the zinc in a bath of mercury, and rub this metal well into the surface of the zinc; lastly, set the zinc in an inclined position over a vessel and drain off excess mercury. Now for the details. Zinc, as it comes from the maker of plates, rods, or cylinders, is often coated with some lubricant, such as grease, or some greasy substance. This may be proved by trying to coat it with mercury, when patches will be found to refuse the mercury. Even if we try to cleanse it with acid the patches remain obstinate. The zinc must first be cleansed in a hot solution of some alkali, such as potash or soda. Next wash in clean water. In the next part of the process, the zincs are pickled in acid and dipped in the bath of mercury. The acid pickle may be made of dilute hydrochloric acid, but I do not advise its use, for it gives off an abominable stench of hydrogen and chlorine. I prefer an acid pickle of one part sulphuric acid in three parts of water. This is mixed in a stoneware or good earthenware baking dish, and the bottom of the dish is covered with a layer of mercury. Plunge the zincs in the acid mixture whilst still hot, and they will take the mercury more readily than when the acid mixture is

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cold. Brush the mercury well over every part of the zincs, on all sides alike, using for the purpose a plate brush, a hare's foot, or a pad of flannel on a stick. If some fine copper or brass wires are introduced among the hairs of the brush, or in the flannel, the process of amalgamation is much facilitated. When the zincs are well coated, set them in an inclined position over a battery cell or other vessel to drain off the superfluous mercury. In amalgamating zincs be careful in the use of sulphuric acid, as its action is very corrosive on skin and clothes. Do the work carefully, without any fuss or haste, or splashing about, and then no harm will result. The zincs will probably get uncomfortably warm, but will not scald the fingers if their position is shifted a little. Brush the zincs downward toward the dish, and away from the person. Do not be afraid to handle the amalgamated zincs firmly, for the mercury will do no harm to the fingers. In reamalgamating zincs it is not necessary to use such strong acid mixture unless the zincs have got black from disuse.

Amalgamating Salt. — French: *Sel à Amalgamer.*—Various devices for lessening the labour of reamalgamation of zincs have been devised from time to time. It has been proposed to cast zinc with a small quantity of mercury added at the time of casting. This has not been attended with any practical benefit. The simple plan of putting a little mercury in the cell with the zinc when the cell is charged very much lessens the labour attending reamalgamation. In a book on electro-plating and gilding, by M. A. Roseleur, an amalgamating salt of mercury is mentioned as a means to lessen the labour of reamalgamation. This salt is made in the following manner:—Prepare a strong solution of nitrate of mercury, boil this for half an hour in a porcelain capsule, and add, whilst boiling, equal parts of bisulphate and bichloride of mercury in excess. Allow the liquid to cool, then filter it through a piece of linen or calico. A wine-glassful of this liquid is mixed with the acid mixture to be used in a quart Bunsen or Grove cell, and this will serve to amalgamate the zinc whilst the battery is working. A table-spoonful of the liquid added to each cell just when the battery appears to flag after a day's work will revive its energies, and the zincs will brush up as if newly amalgamated. This liquid salt of mercury is slightly tinged with green, but otherwise clear. It is very heavy, and very poisonous. It stains the skin a violet tint. When added to water alone, it falls as a yellow precipitate, but if the water is acidulated with sulphuric acid no such precipitate occurs.

Ammonia.—Chemical symbol, NH_3, combining weight 17, density 8·5. It will be seen that ammonia is a compound of nitrogen and hydrogen. It is obtained from the decomposition of animal or vegetable matter containing nitrogen and hydrogen, as from the horns, hides, and excrement of animals, and from coal when heated. Its name is derived from sal-ammoniac, a compound of ammonia and chlorine, obtained by Arabs from camels' dung, which they heated for the purpose near the temple of Jupiter Ammon, in the deserts of Libya. It is now mainly obtained from the ammoniacal liquors of gasworks.

Pure ammonia is a colourless gas of powerful and pungent odour, much lighter than air. This gas is soluble in water, and its solution is known as the ammonia (*liquor ammoniæ fortissimi*) sold in druggists' shops. In all operations wherein ammonia forms an ingredient, this is the solution intended, unless otherwise specified. Its action is distinctly and strongly alkaline. Its presence in solution is generally indicated by its odour, which is unmistakable. A very dilute solution of copper will indicate the presence of ammonia, unless cyanide of potassium is present in one of the solutions. Some very dangerous explosive compounds can be made by mixing ammonia with solutions of the noble metals. (See *Fulminates.*) The strong fumes of ammonia act as a poison by producing violent inflammation of the air passages and the mucous lining of the throat and stomach. The antidotes to this poison are dilute vinegar and olive oil. Ammonia must be kept in glass-stoppered bottles, with the stopper tied down.

Ammonium. — Chemical symbol, NH_4. This is supposed to be a metal, but it has not yet been obtained in a free state. It has been separated from ammonium chloride and made to form an amalgam with mercury, but this soon decomposes into ammonia, hydrogen, and mercury. It forms the base of several valuable salts of ammonium.

Ammonium Carbonate.—Chemical symbol $(NH_4)_2\ CO_3$. This is a compound of ammonium, carbon, and oxygen, obtained by heating a mixture of chalk and sal-ammoniac, and is named *sal-volatile.* On exposure to the air this absorbs water and carbonic acid gas, and becomes ammonium bicarbonate. This is, probably, the white crumbling salt obtained from shops under the name of carbonate of ammonia. It is used as a substitute for liquor ammonia in the preparation of some depositing solutions. It should always be kept in closely-stoppered bottles, or it will lose its most valuable properties.

Ammonium Chloride.—Chemical symbol, $NH_4\ Cl$. Named also, *muriate of ammonia* and *sal-ammoniac.* This compound of ammonium and chlorine is obtained by neutralising the distilled ammoniacal liquor of gasworks with hydrochloric acid, and evaporating the liquid to dryness. It is also prepared from a mixture of ammonium sulphate and common salt. Sal-ammoniac, when heated, completely volatilises without melting. It is very soluble in water, to which it communicates intense cold whilst dissolving. Its solution is used as an excitant in the zinc compartment of electric bell batteries, notably the Lèclanchè battery. It has also been used in making up solutions for electro-depositing iron and cobalt. For these purposes the crushed commercial sal-ammoniac will do very well.

Ammonium Nitrate. — $NH_4\ NO_3$. This is prepared by neutralising ammonia with nitric acid. It crystallises in long transparent elastic needles, very soluble in water. Used in making up Brunel's, De Salzede's, and Walenn's hot brassing solutions.

Ammonium Sulphate.—$(NH_4)_2\ SO_4$. This useful salt of ammonium is prepared on a large scale for commercial purposes by adding sulphuric acid to gas water, the liquor of gasworks. Used in making up the double sulphate of nickel and ammonium solution, and also in the make-up of Jacobi and Klein's and Boettger's iron solutions, Hermann's zinc solution, Walenn's hot brassing solutions, and the double sulphate of cobalt and ammonium depositing solution. The salts of ammonium may be recognised by their odour when heated with caustic lime, caustic soda, or caustic potash; the odour of ammonia being characteristic and well known.

(*To be continued.*)

PAPIER-MÂCHÉ.

How to Mould It, and how to Ornament It.

BY SYLVANUS WARD.

II.—CONSTRUCTION (*continued*). — PAPIER-MÂCHÉ IN CABINET WORK—WORKING IN PULP—A BRACKET—A DAVENPORT—PAPIER-MÂCHÉ AS A SUBSTITUTE FOR CARVING—ELIZABETHAN PANEL WORK — SIMPLER ARTICLES — TEA-TRAYS, ETC.

IN the present paper it may be well to explain the construction of more important articles than those mentioned in the last, and such as, together with moulding, combine a considerable amount of joinery work.

There are certain purposes in cabinet making for which papier-mâché has advantages over wood.

1st. It is lighter, because in many cases thinner work can be used without any sacrifice of strength.

2nd. In it all kinds of *curved* surfaces can be made as strong and as easily as plane ones.

3rd. It is more suited to fret work on a large scale, because as there is no grain there is no danger of splitting. Hence very large curves may be fearlessly cut in it with the bow saw.

It can, moreover, when required, be made equal, if not superior, to wood in a solid mass; as, for instance, say, in the pillar of a table. The shell formed by moulding, or by gluing panel together, can be filled up with pulp; so much strength as would be thus attained is, however, rarely needed.

As regards *pulp.*—The Swedish wood-fibre pulp is now much used. Paper pulp is made by beating up scrap paper with water till it is thoroughly disintegrated; then squeezing out the superfluous water and mixing it up with strong glue-paste to the consistency of mortar. This can be pressed in moulds, or built up and shaped with a spatula to any desired form; but in the latter case a little only can be done at a time between repeated dryings. When only a small quantity of pulp is wanted, a mixture of glue-paste with the paper-dust formed in rasping, sawing, and otherwise working the papier-mâché, will suffice. In Fig. 6 is shown the spatula, or small trowel used for working in pulp.

The *bracket* (of which Fig. 7 is a front, Fig. 8 a side elevation, and Fig. 9 a plan of shelf) may most easily be made in two pieces, exclusive of the acorn pendant, which will form a third. The back is sawn from panel, say, two ¼ in. thicknesses glued together. The trefoil may eventually be fitted with mirror, or left open, as preferred. The projecting portion is pasted in one piece on a model, but some little after-dressing is required to bring up the mouldings clearly and well. The back in the lower part passes within the mouldings, which are a comparatively thin shell, to give the necessary strength. The acorn pendant will be most readily turned in wood, and formed with a little stalk to its cup, to be glued into a hole made to receive it. Possibly this bracket, especially in its lower part, may give the impression of being somewhat heavy, but this will not appear when after enrichments of gold and pearl have been added.

Figs. 10 and 11 give front and end views of a "Davenport" writing table. Of this article the most important and elaborate parts as regards our present business—construction—are the legs. These should be an inch in thickness—that is, they should consist of four thicknesses of ¼-in. panel glued together. These are cut out to

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pattern with the bow saw, and finished with rasp, sand paper, etc., as if in wood. At *a*, Fig. 11, is indicated a groove cut on the inner side of each leg, a quarter of an inch deep, to receive the end of the ornamental cross rail which connects them.

This ornamental rail, shown in the front elevation, will be seen to be of fret work, designed with a lightness and boldness which the danger of splitting would render impracticable in wood. A less stout panel is used for this, say ¾ in. thick.

Still thinner panel will be used above in the desk portion, of which it needs only to be said that it is made in precisely the same way as if the material were wood. In the interior fittings of drawers and compartments, some economy of space may be effected by the use of papier-mâché, as very thin panel, say ⅛ in. thick, will suffice. The desk will be screwed down upon the legs after both it and they have been decorated.

In making such an article as the present, a considerable quantity of panel will have to be planed. This can only be properly done with a toothed plane, as the tendency of an ordinary smooth plane is to tear up the sheets of paper in flakes, rather than to reduce the surface to a true level.

Where there is a considerable amount of joinery work, as in many parts of the article before us, it is well, previous to gluing together, to give the material a coat of the black japan varnish (of which more presently), which, after drying, should to a great extent be scraped off again with a chisel worked backwards. This last operation removes any glossiness of surface which might have interfered with gluing; and the varnish hardens the papier-mâché, and prepares it for future treatment. After this, the little compartments within the desk will need only one coat of the varnish subsequent to putting together, and that will have in some measure to be scraped off as above, in case they are finished, as they will most likely be, by papering with some kind of ornamental paper. When also silk or velvet is used to line or mount, the surface of the varnish has in the same way to be scraped off before it is glued down.

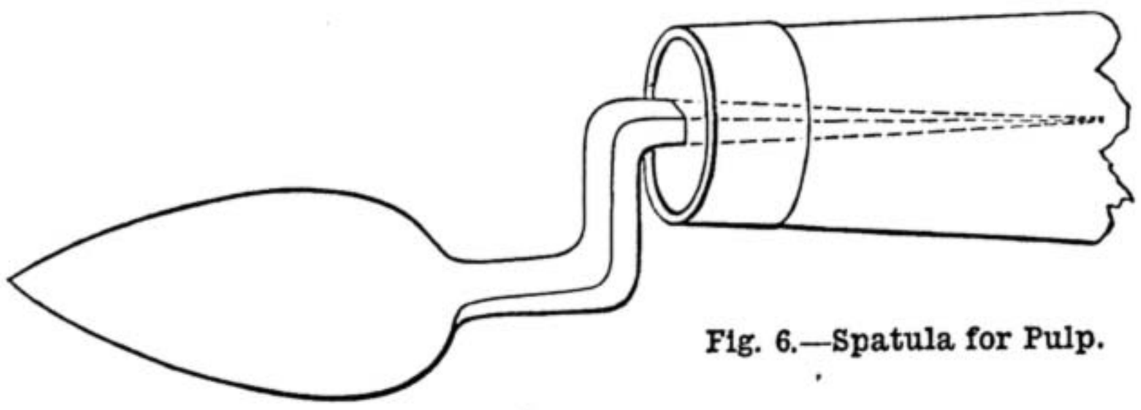

Fig. 6.—Spatula for Pulp.

All joinery work should, however, be done before the final coat of japan varnish is given to any outer part, since it is next to impossible to cut the hard and highly polished japanned work without chipping the edges.

The ball feet and the acorn pendants are, of course, made separately. Such things are usually turned from wood—American birch wood by preference. It is true that in wood it is not possible to get a surface equal to papier-mâché, but the ball feet are much below the eye, and not being highly ornamental, they will escape any particular scrutiny; whilst the small size and rounded form of the pendants will also, to some extent, exempt them from close observation. The inferior material is held to be sufficient; though there is no reason why the pendants, if of no great size, should not be turned from paper; or if large, why they should not be pasted on models. The ball feet are fixed in place with screws; the acorns end above in little stalks, which are glued into holes bored to receive them.

To the worker of artistic tastes all these instructions for the merely constructive part of the art will doubtless seem tedious; for the effect of the work in the articles hitherto spoken of almost wholly depends on the after decoration, about which we have not as yet touched, but which will be fully dealt with farther on.

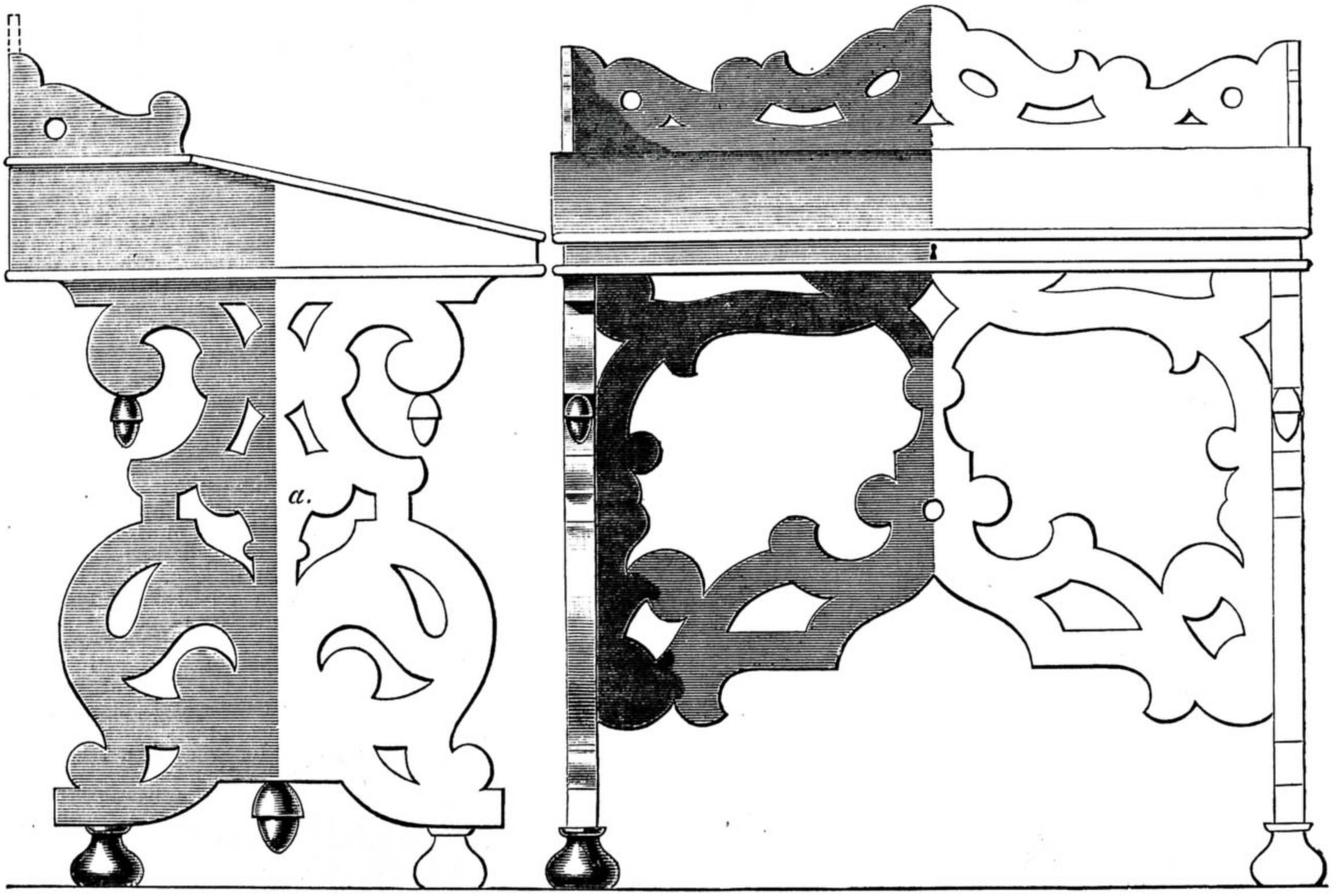

Fig. 11.—Davenport in Papier-Mâché: End Elevation.

Fig. 10.—Davenport in Papier-Mâché: Front Elevation.

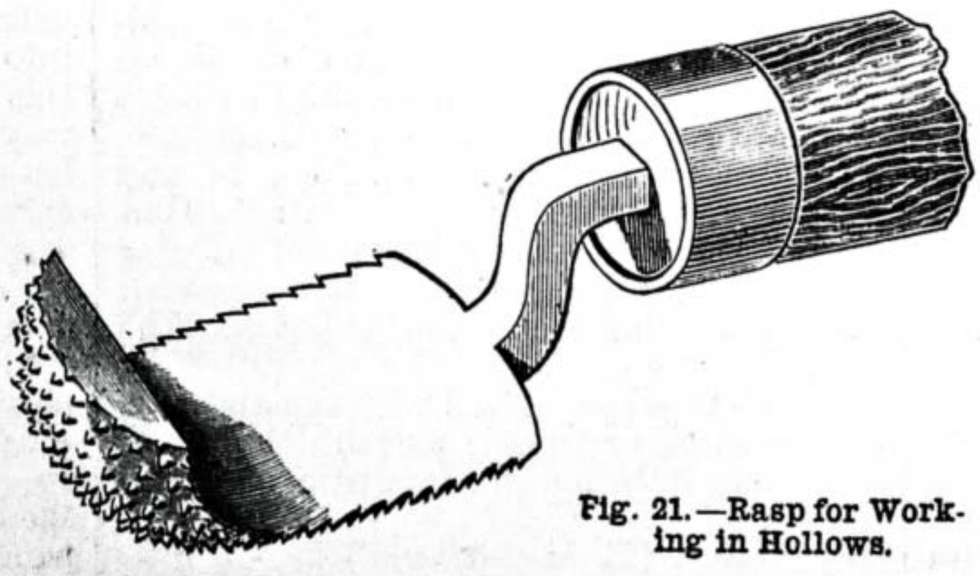

Fig. 21.—Rasp for Working in Hollows.

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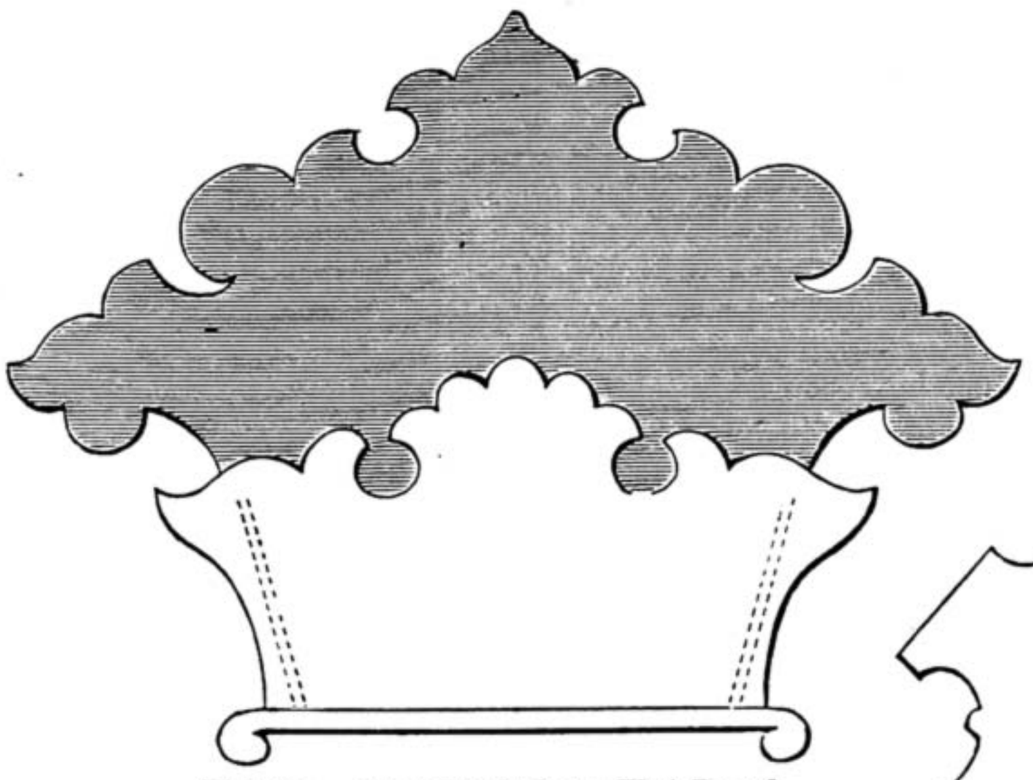

Fig. 19.—Card Rack from Flat Panel.

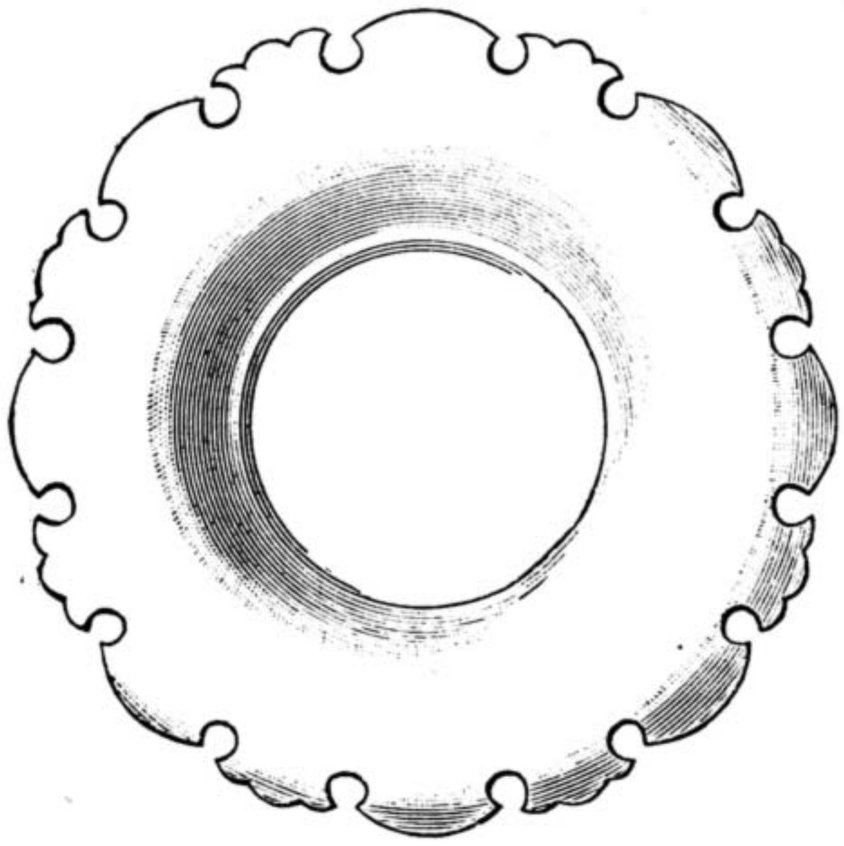

Fig. 15.—Tray of Saucer-like Form: Plan.

Fig. 16.—Tray of Saucer-like Form: Elevation.

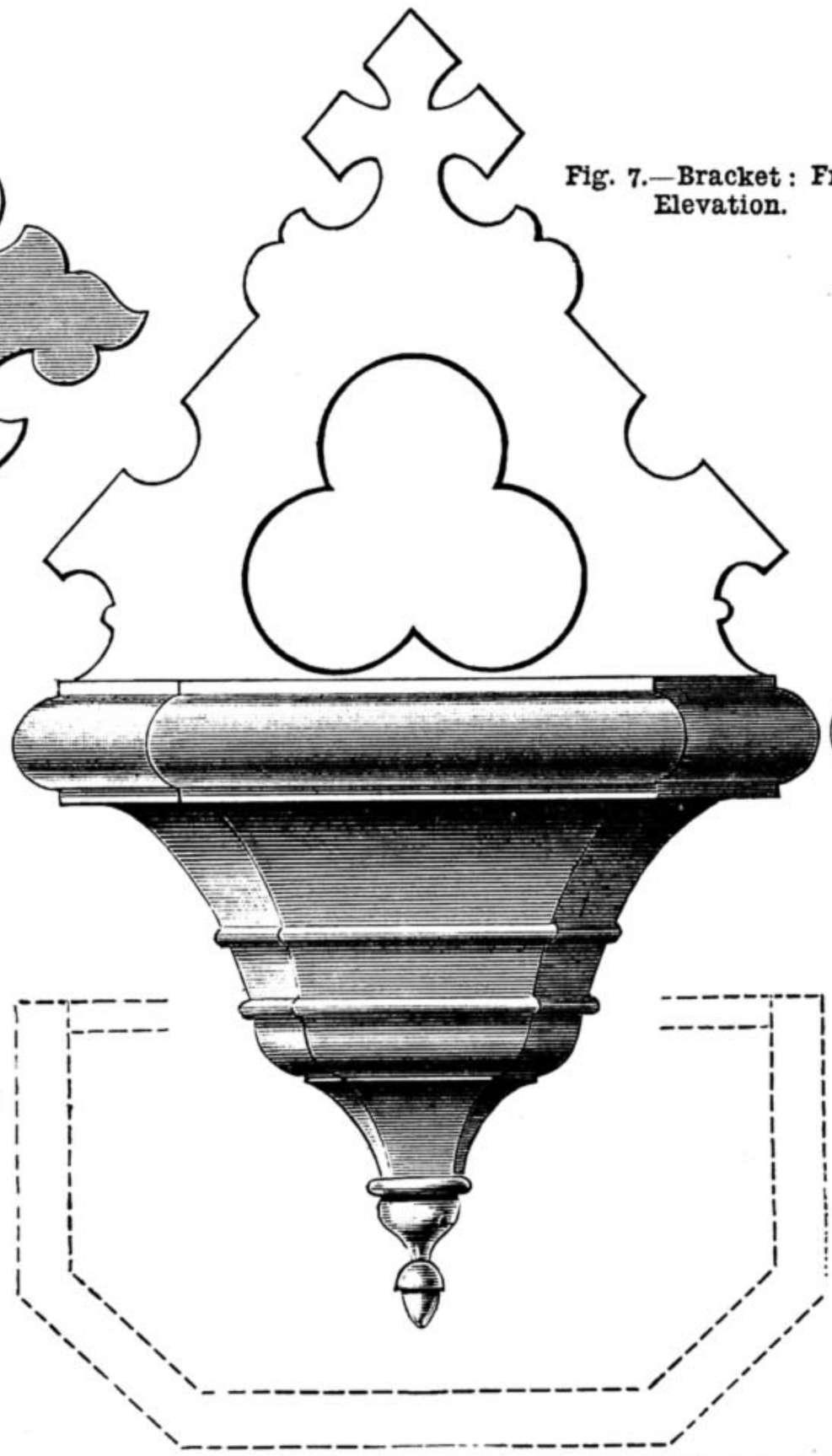

Fig. 7.—Bracket: Front Elevation.

Fig. 9.—Plan of Bracket.

Fig. 20.—Side Elevation of Card Rack.

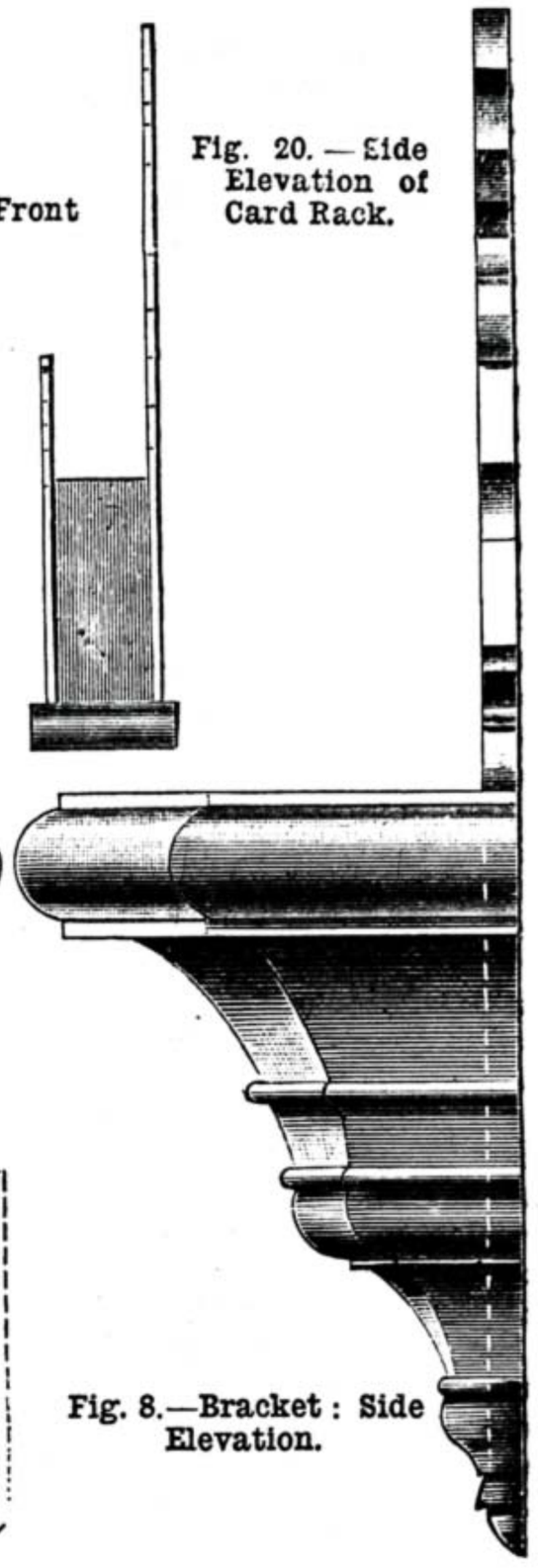

Fig. 8.—Bracket: Side Elevation.

Fig. 17.—Tray of Saucer-like Form.

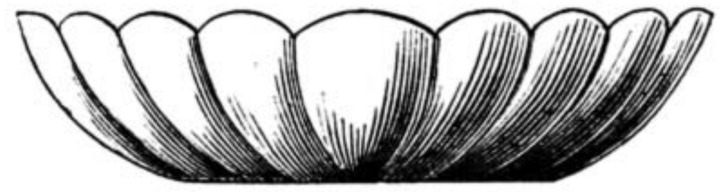

Fig. 18.—Tray of Saucer-like Form.

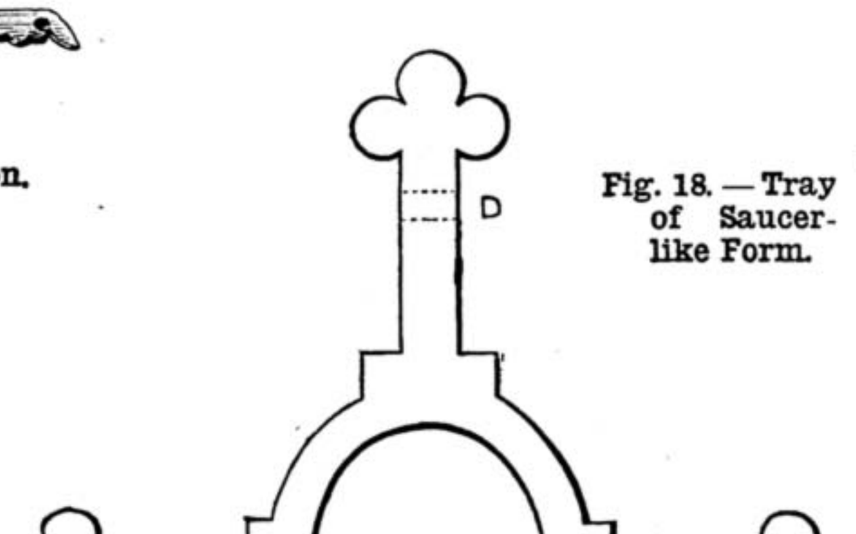

Fig. 14.—Cross from Flat Panel.

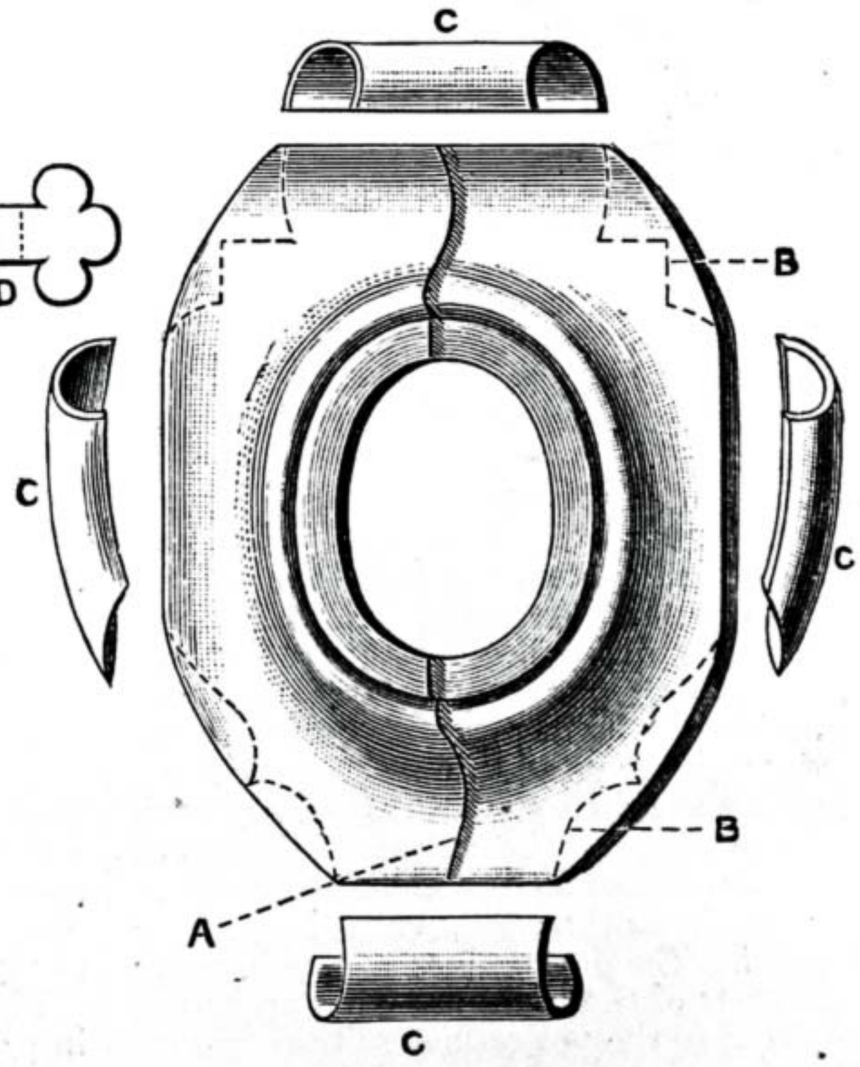

Fig. 13.—Parts of which Fig. 12 is composed.

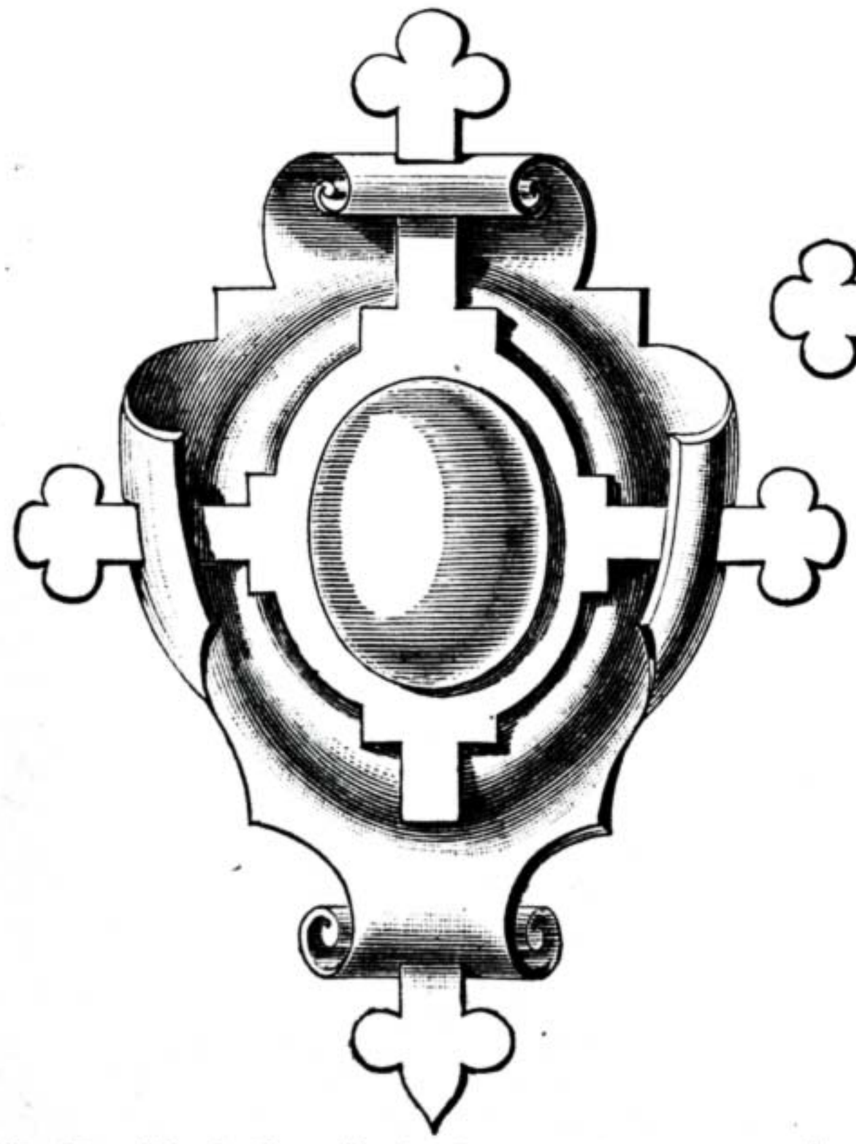

Fig. 12.—Elizabethan Centre Ornament in Papier-Mâché.

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There are, of course, ways in which papier-mâché is made decorative by form alone. Many architectural ornaments for interior work are now made of pulp (shaped in moulds) instead of plaster of Paris, over which this material has an advantage as being less liable to break or chip. Such things scarcely come into our province; but something in the way of ornament is to be done by modelling pulp with the spatula, as well as by pasting on the model. For house decoration papier-mâché may be made to serve as a cheap and easy substitute for wood carving, especially in the production of the style of ornament known as Elizabethan.

The chief characteristic of this style is the manner in which the extremities of its shields or cartouches are bent, rolled up, pierced, and interlaced with other members of the composition, to an extent which induces the conclusion that they must have had their origin in ornaments cut in leather, or some such pliant material, and afterwards curled and arranged in this fantastic fashion. Yet by whatever it may have been suggested, there is no question but that such ornament, when carved in wood or stone, is highly pleasing from its richness and variety.

But to carve it is laborious and costly, as must have been felt even in the Elizabethan age; for in an elaborate house of the period with which the writer is acquainted, the decorator has formed his shields, scrolls, etc., of sheet lead, rolled and interlaced in the usual manner. These are nailed to the oaken panels, and painted so as to make them look, as far as possible, a part of them.

A later decorator, having a like object in view, would have made his ornaments of plaster, which would speedily have chipped and exposed the deception. The lead has not chipped, but it has bent, and become indented wherever it has received a blow, and thus betrays itself; besides, there is a certain thinness and meagreness about it which to a practised eye at once distinguishes it from wood carving.

Yet the idea of producing a rich effect by inexpensive means was a good one; and had the decorator been acquainted with papier-mâché he might have made a complete and enduring success. His enrichments would then have been strong and rigid; they would neither have chipped like plaster, nor bent like lead, and would have been less liable to suffer from accidents than oak itself.

Fig. 12 is an Elizabethan enrichment which might serve as the centre of a panel, either on a large scale in a panelled room, or on a smaller one in cabinet work. The models for pasting once made, it can be reproduced to any desired extent.

It will be seen that it consists of three members—the cartouch, the cross, and the carbuncle or rounded centre. Each of these will have to be made separately. For the cartouch the models are drawn in Fig. 13. The comparative projection of its parts is shown by the sectional line, A. The main portion is first pasted, cut from the model, and sawn to shape as at the dotted lines, B, B, and partly dressed. The curved portion, C, C, pasted on separate models, can be glued on; and the rolls at top and bottom completed by gluing on additional strips of panel and giving the little shaping necessary with chisel and gouge. The cartouch can then be dressed altogether as described above.

Fig. 14 shows the cross, which is cut from flat panel. The dotted lines at D, D, indicate where parts of the limbs are cut out, and it is so fitted to the projections of the cartouch as to give the effect of piercing through them. Pieces of thicker panel will need gluing behind the ends to bring their backs level with the general plane of the back of the cartouch; and between the cross and the cartouch, where it does not touch, the spaces can be filled in with the paper-dust mixture.

The carbuncle requires a separate model. This is turned simply to an oval. The paper shell is sawn, when pasted, down the longest diameter of this oval, and thus two carbuncles are formed at a time. The carbuncle is, like the cross, glued into its place.

When finished, this piece of ornament may be fixed to the panel either simply by gluing, or better, by fancy-headed screws, or by common screws the heads of which are sunk and concealed. It should not, like papier-mâché in general, be coated with the ordinary black japan varnish, but should be painted with the panel so that both may appear one piece.

The above examples have rather been chosen as showing how for certain purposes papier-mâché possesses advantages over wood; and as also showing how the difficulties which may arise in working it are best to be overcome. But the variety of articles suited to, and ordinarily made in, papier-mâché, in which the construction is so simple as to need little or no explanation, is very considerable; and on some of these the beginner may, perhaps, rather choose to exercise his skill. Instance, for example, all the variations of what we may call the saucer-form: trays for smokers, for pins, for pens, for pools at round games, etc. etc., which can be made of many shapes, more or less ornate, by pasting on one model only, as may be seen in Figs. 15, 16, 17, and 18 (15 and 16 are two different views of the same tray). Or such articles as are made by a simple combination of pieces of panel—flat brackets, pipe racks, card and letter racks, etc. Figs. 19 and 20 show a card rack thus made.

Whilst speaking of such simple matters some mention ought to be made of a class of articles for which, perhaps, more than for any others, papier-mâché has been employed, namely, for tea and other flat trays. In making a tea-tray the rim is pasted, in a single piece, on a model which, if large, is necessarily somewhat cumbrous, since it has to be a sort of wooden frame, strengthened with cross pieces. The bottom of the tray is of flat panel, glued to this rim.

Almost all articles of furniture may be, and in the days when papier-mâché was a fashion have been, made of this material; and these admit of an amount of surface enrichment which would not be attempted on wood. Perhaps it has been most successfully used in small tables; chess tables especially. The alternating squares in pearl and black, tastefully ornamented, may often be works in papier-mâché that leave nothing to be desired.

While I am writing of furniture made of papier-mâché I may as well take the opportunity to point out that many things much in request in the present day may be easily and successfully made in this material. For example, nothing is easier and more simple than with a core of wood, on which to paste the sheets of paper, to imitate one of the Japanese umbrella stands, as a counterfeit of which many are content to use earthenware drain pipes, painted and otherwise ornamented to suit their fancy. The paper stand, to my mind, would be infinitely preferable.

Fig. 21 gives a form of rasp very useful in papier-mâché for working in hollows.

(To be continued.)

"TIPS" FOR TYROS.

BY OPIFEX.

5.—Fixing Transfers for Carbon Paper.

Those who use carbon paper for transferring designs, and for the other various uses to which it is put, often find that when freshly made the transfers, etc., are very liable to get "smudged" and spoiled. This evil may be avoided by sprinkling French chalk upon the transfer, rubbing over with the hand, and then dusting off the chalk.

Transfers upon brass for *repoussé* work treated thus will even stand the process of "pitching" without being obliterated.

6.—Muzzle for Ferrets.

Should any of our mechanical friends be of a sporting tendency, it may be useful to them to know how the best kind of ferret muzzle may be made.

Chuck a piece of beech, 3 in. diameter by 4 in.; turn it into a conical shape, and then turn off the point right across, until the diameter of the face is an inch. Now take a piece of sheet brass No. 22 gauge, B.W.G., or about $\frac{1}{32}$ in. thick, and mark out with a compass a disc 2 in. diameter. Place and centre it upon the face of the chuck, fastening it thereto securely with strong tacks, or by a screw arrangement; when perfectly secure spin it rapidly and, using oil freely, apply a smooth, blunt tool to the brass, commencing at the shoulder of the cone, and applying considerable pressure. Work out gradually to the circumference of the disc; in this way the metal will assume the shape of the chuck, and when it is sufficiently bent, a band about $\frac{3}{16}$ in. wide may be cut with a sharp-pointed, graver-shaped tool.

This band constitutes the muzzle, and the size will, of course, depend upon the size of the animal for which it is intended.

Having smoothed the edges of the brass with file and emery cloth, drill two holes at the opposite sides, so that the line between the holes shall divide the diameter of the circle one-third of its length from the circumference. Between these holes a small rod of iron wire is to pass; this rod has an "eye" turned upon one end, while the other is passed through a small screw plate. Next "tap" one hole to suit this screw, and rime out the other so that the wire may pass through it.

When the muzzle is placed upon the ferret, this wire rod is inserted behind its long canine teeth, and screwed up, which effectually prevents the animal laying hold of its prey, while it does not otherwise interfere with its comfort in the slightest.

LATHES AND TURNING APPLIANCES.

BY F. A. M.

III.—The Overhead Motion.

Overheads—Ambition of Amateur Workmen—Object of Present Paper—Additions to Plain Lathe—Result of Work Done in Plain Lathe—Revolving Tool in Slide Rest—Its Action—Drilling Spindles in Plain Lathe—Cylindrical Work—Face Work—Face Plate—Holtzapffel's Overhead—Milnes' Overhead—Evans's Overhead—Birch and Company's Overhead.

Having considered with my readers the most desirable mode of procedure to be followed, both in choosing a lathe and testing a lathe, we may now pass on to consider some of the appliances that have been added to the ordinary plain lathe, in order to enable the turner to produce turned work of an ornamental character.

In the present paper I propose to give some

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account of several of the best forms of "overheads," as the overhead motions of turning lathes are often called, to point out their advantages and disadvantages, and to conclude by giving drawings and description of a simple form of overhead which our readers will probably be able to make, in part at any rate, and add to their lathes.

Amateur workmen take much more pleasure in contriving and inventing an arrangement for themselves which they fondly suppose will surpass those contrivances which are the result of the accumulated experience of many workmen and designers who make a life study of their work. If professional workmen proceeded in the same way, they, too, would meet with almost as many failures as the amateur. Instead of doing this, the professional will set before him some tried scheme known to answer its purpose well; and, copying that, will not deviate from it until he finds by experience that it has defects which he sees he can remedy.

While not desiring that our readers should follow in a slavish way what has been done by others, even though it might be by far the safer road to success, yet we may at any rate press upon them the necessity for making themselves acquainted with what has been done by others, before attempting to strike out an independent path for themselves. The following descriptions are intended to help them to do this, and to form a foundation on which they can build constructions less likely to prove disappointing, and also to enable them to choose which of the several plans to be described will be most likely to suit their own particular circumstances.

The first addition to the plain lathe will be the slide rest; then comes the division plate and index; and then the overhead motion. Leaving the division plate for a future paper, let us now consider the overhead, an extremely useful addition for metal and ornamental work, and one which an amateur may make, in great part, for himself.

When the work is revolved in the plain lathe and cut by fixed tools held either in the hand or in the slide rest, the result is naturally of circular section. But if, while the work is firmly held in the lathe as before, instead of revolving the work we rotate *the tool*, and, while so rotating, we bring it up to act upon the work, we can then produce an infinite variety of different forms. Now, the revolving tool may be a drill or a single-point "flying" cutter, or it may be a serrated disc, something like a small circular saw called a milling cutter; all these are carried by "frames," in which they revolve, which frames are grasped and held and guided by the slide rest. From this explanation it will be seen why all these different appliances depend one upon another, and that the overhead is of no use without the slide rest and division plate; and only when the turner is provided with these three can he go on to add the drilling instrument, vertical, horizontal, universal, eccentric-cutting frames, and other instruments used in connection therewith. All these revolving tools being held in the slide rest, require to be set in motion from the treadle and fly wheel, and this is the peculiar office of the overhead motion; it should be noted, however, that the revolving tools do not remain in one fixed position like the mandrel, but they must be capable of being applied to their work in several positions, and must be capable of being moved whilst at work without throwing off the band or cord by which they are driven.

Let Fig. 1 be the plan of a lathe bed, with headstock and chuck in position; then *a*, *b*, *c*, and *d* are four different positions, which a drilling spindle might be required to occupy whilst its pulley is being driven by the band from the overhead. For instance, suppose Fig. 2 were placed upon the mandrel; here we have the base of a column to be fluted; we require for this a drill with a rounded end fixed in the drilling spindle, which must then be approached by one screw of the slide rest till it cuts into the work to the proper depth, and then by the other screw of the rest it must be slowly traversed to the right, as from *a* to *b*, while rapidly revolving all the while, so as to cut out each of the flutes. The band then must lead down to the pulley of the drilling spindle and drive it in position *a*, and also in position *b* about 12 in. from it; also in any intermediate position between the two; and it must allow of the driller being withdrawn from the centres backwards towards the workman at least 3 in., as would be required if it were operating upon a larger diameter. It might also be necessary to traverse the driller still further to the right, say 2 or 3 feet; this is provided for in some "overheads," but is rarely required.

Besides cylindrical work, such as is shown in Fig. 2, we require to do "face work," such as that shown at Fig. 3. Fig. 3 may represent a face plate, requiring to have a long hole made in it by slot drilling—that is, by a drill made so that it will not only bore a round hole while being pressed forwards, but also cut while it is slowly traversed sideways, much after the manner of the fluting drill in the preceding example. This necessitates positions *c* and *d* (Fig. 1), which positions, like *a* and *b*, are also liable to a variation of several inches, endways of the drilling spindle, according to the length or overhang of the work.

Many other positions may be required, but if the overhead will guide the band fairly to the pulley of a driller in these four positions, it will also act satisfactorily in any other position that is likely to be required.

Fig. 4 shows the kind of overhead which is made by Messrs. Holtzapffel, of 64, Charing Cross, who are considered the first makers of ornamental turning apparatus, as they are also the most expensive. The drawing is taken from the most excellent book on ornamental turning, which forms the fifth volume of their work, "Turning and Mechanical Manipulation;" the headstock and lathe bed have, however, been added, for clearness' sake, in their relative position beneath the overhead. The apparatus consists, first of a shaft or spindle, *s s*, about 22 in. long and $\frac{5}{8}$ in. diameter, carrying at the left-hand end a small stepped pulley, by means of which motion is communicated to the spindle from the fly wheel of the lathe by a catgut band; the rest of the spindle is occupied by a roller of about 4 in. diameter, lightly made of wood, and mounted on the spindle by means of brass ferrules, one at each end. The spindle runs on points carried by a bent bar, *b b*, which bar is hung by adjusting screws to the ends of a spring supported by its middle by a tall iron bar, *a a*, bent over at the top, and fixed to a second upright, *c c*, which is supported by the bracket, *d*, on the left end of the lathe bed, whilst the socket, *f*, holds the lower end steady. Thus the upright is formed of two pieces, *a a*, *c c*. It is grasped by the screw of the bracket, *d*, so that while it can turn in *d* and *f* it cannot rattle or shake. To bring the roller over the pulleys of the drilling spindle at positions *a* and *b* (Fig. 1), the top of *a a*, where it carries the spring, would be pulled forward so that the band would run straight down, being twisted one quarter round. As the drilling spindle traversed from *a* to *b* (Fig. 1) the band would travel of its own accord along the barrel or roller.

The positions *c* and *d* (Fig. 1) present no difficulty, and here the band has no quarter twist. The tension of the bands is regulated by the milled headed screws at each end of the spring. The spindle, *s s*, is adjusted fairly horizontal by regulating the length of the shorter band; and, for some of the less used instruments, it is necessary to have separate bands of slightly different lengths. This and the fact that one cannot act upon long work reaching more than a foot from the mandrel are the only and slight disadvantages of this excellent arrangement. Its chief and very important advantage is that it runs more easily than any other kind of overhead, its only friction being that at the ends of the spindle, *s s*, where it runs on points. Two lesser advantages are that the oil is not so liable to be sprinkled upon the work from the ends of the spindle, *s s*, as from the guide pulleys employed in many other forms of overhead, and that the interposition of the spring between the spindle and the upright, besides keeping up the requisite tension, absorbs any tremor that might otherwise have been communicated to the lathe bed. This form of overhead is often called "the goose-neck."

Fig. 5 shows the arrangement adopted by several makers. The illustration is copied from a woodcut of a lathe by Milnes, of Bradford. The overhead shaft carries a long roller which makes the overhead effective upon any part of the lathe bed, an advantage not possessed by the last example. The overhead shaft is not capable of being drawn up by a spring to tighten the belt, and therefore some other plan must be found for regulating the tension. Upon the stay bar, *b b*, slides a socket, *s*, which is bored through transversely so as to take a small bar, *c*. One end of this bar carries an adjustable spherical weight, and in a fork at the other end runs a small pulley. The bar swings on the stay bar so that the weight bears up the pulley against the band, giving it the proper direction and regulating the tension. The danger here is that the oil applied to the small pulley should fly upon the workman and damage the work with spots, but this is partly obviated by making the pulley with a long and very small boss. It might be still better to cause the little pulley to run on points by driving through it a small spindle, and putting small centres, in the shape of pointed screws, through each side of the fork. Mr. Milnes now prefers to make the roller 10 in. long, to slide on a feather upon the shaft wherever it may be required; also the stepped pulley to the left has been omitted, as it was not found to be of much service.

So long as the drillers, etc., are used in positions *c* and *d* (Fig. 1) this overhead works well; but with the positions *a* and *b* it will be less satisfactory, since, though the band will travel of itself along the drum, the socket, *s*, will have to be pushed by the hand if the driller traverses far.

Coming now to Fig. 6 we find another plan, which but slightly differs from the foregoing. Here the stay bar is uppermost; it carries the weighted lever above it, and the lever carries at its front end *two* pulleys which draw up *both* sides of the driving band, giving an ample allowance for those

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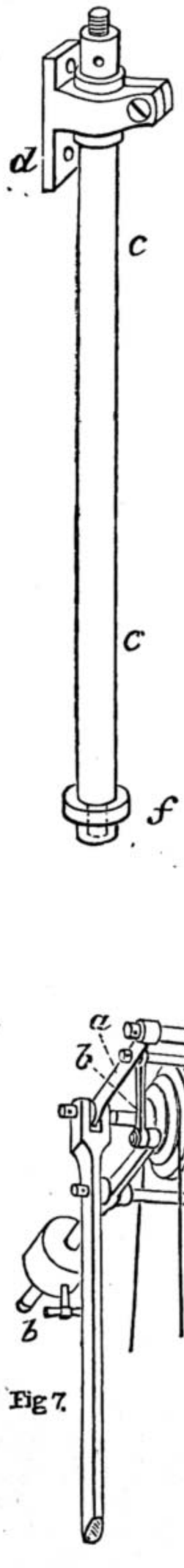
cutting frames which would have required bands of shorter lengths if driven by the two foregoing examples. But then its second pulley adds slightly to the friction. On the roller shaft is seen a speed pulley, driven from the fly wheel below, and allowing of a variation in the speed: a decided advantage which this form has over the preceding. Mr. J. H. Evans, of Wardour Street, London, makes an overhead motion bolted to the lathe-bed and may possibly communicate to it a slight amount of disturbance. The arrangement, however, would only be applied to a rather strong lathe. The particular example illustrated is taken from a photograph of a lathe made by Messrs. G. Birch and Company, of Islington Tool Works, Salford. The lathe to which it is applied is of 5½ in. height of centres; it is suited both for metal work and ornamental turning; it is expensive of necessity, yet not so expensive as some, and it is believed by the present writer to be the most perfect overhead motion mounted upon the best lathe that he has yet seen. This does not prove that it would suit all our readers equally well, nor that all should go to the extra expense involved; some who wish to do ornamental work only, would probably be best suited by the first example given; whilst others who could not afford to buy the overhead under consideration, and yet wished to do long work, would find the example in Fig. 6 cheaper and efficient. Looking at Fig. 7, it will be seen that the spindle, *s s*, which carries the drum is supported by lever arms, *a*, *a*, turning in the forked tops of the uprights. These arms are held up by links, supported by other levers, *b*, *b*, carrying weights, which weights serve not only to support the weight of the spindle and arms, etc., but to put the proper amount of tension upon the band which runs on the drum. The drum, then, is capable of vertical adjustment, and no tension pulleys are required. There are, however, two other centres of motion at the ends of the first motion shaft, *d d*, which shaft receives the motion from the fly wheel upon its speed pulley at the left-hand end, and communicates it to the spindle, *s s*, at its right-hand end, by means of another pair of speed pulleys, so that changes of speed can be made from the fly wheel to *d d*, and from *d d* to *s s*, giving great variety.



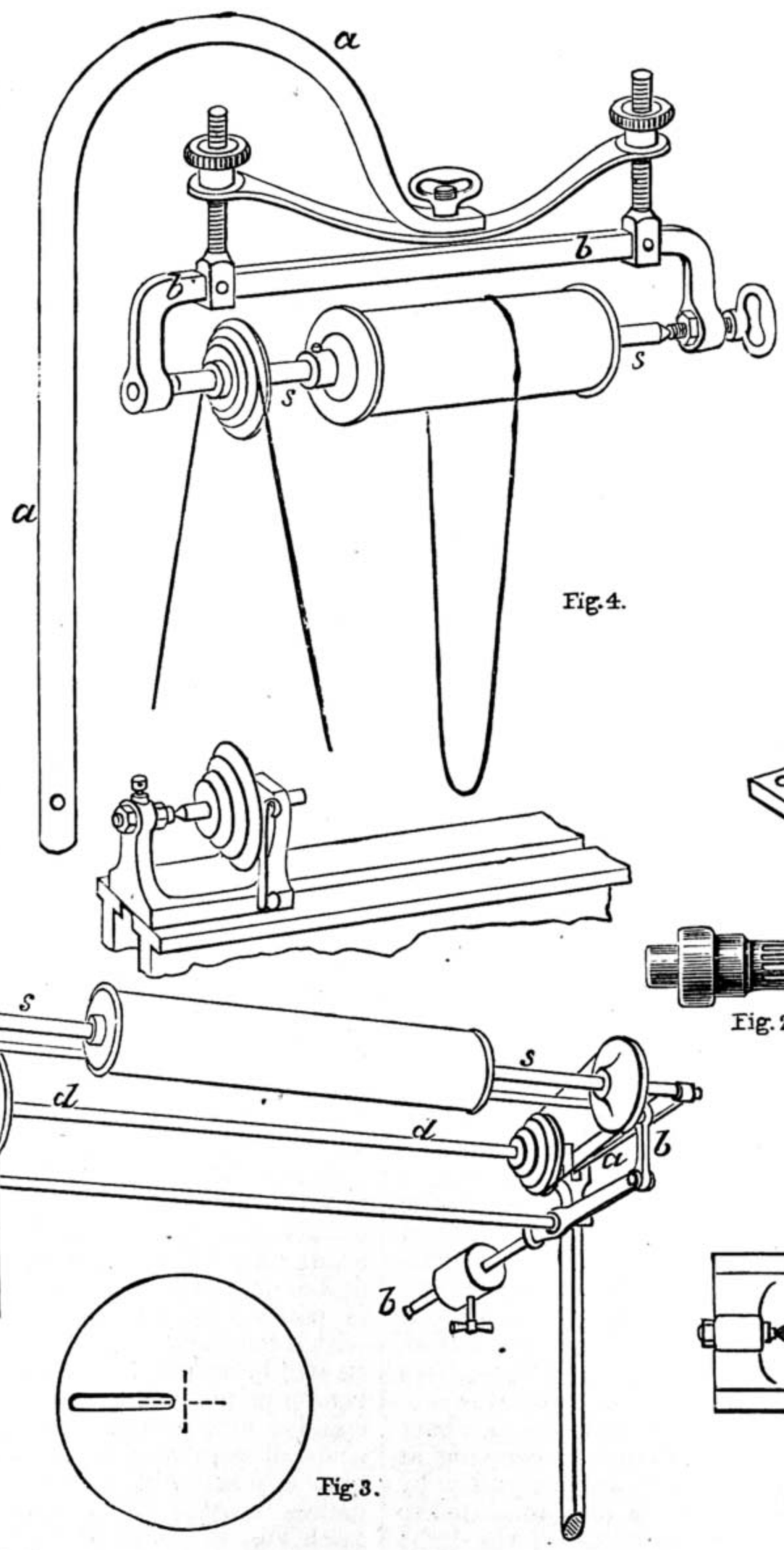


Fig. 4.

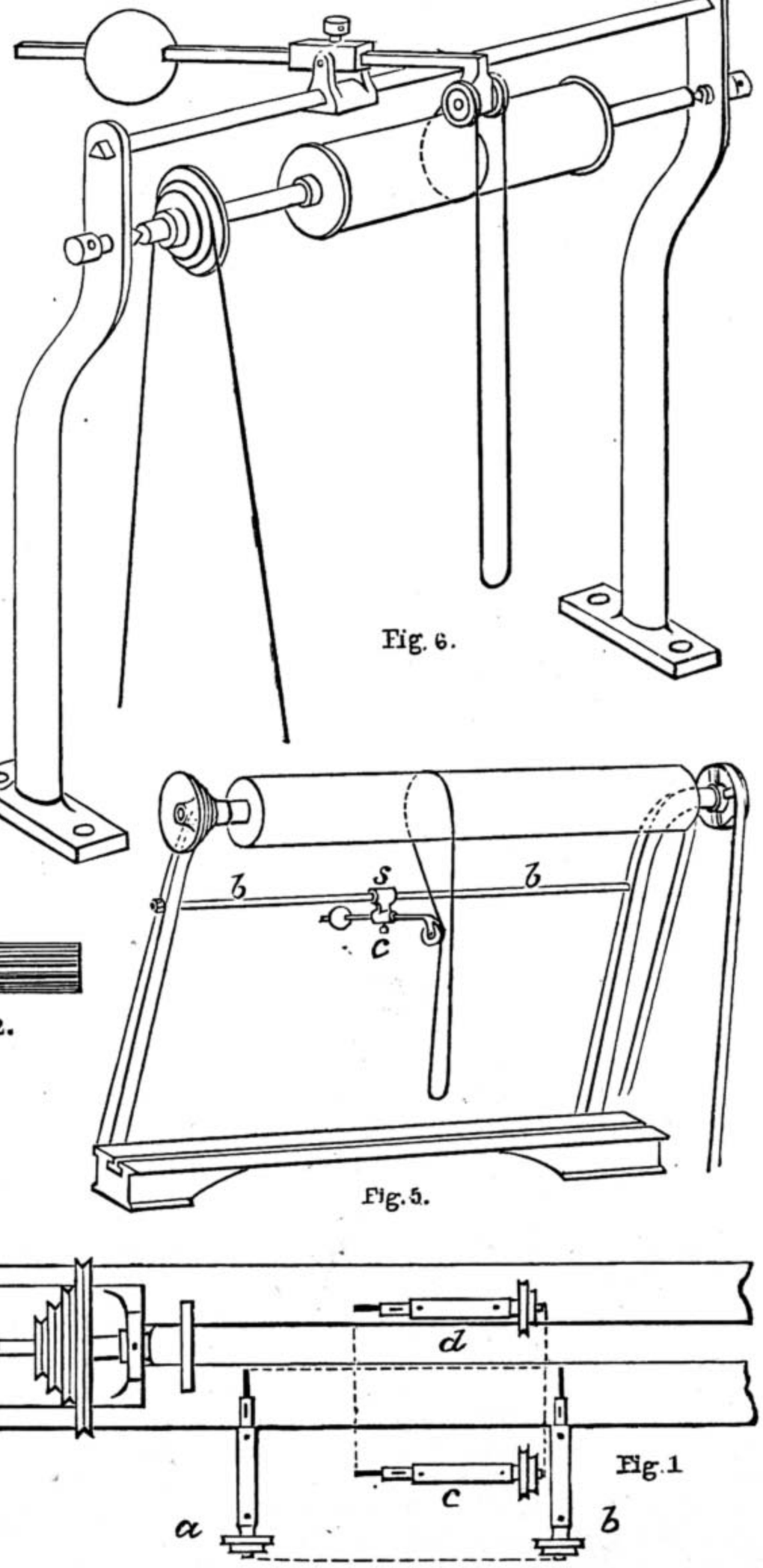


Fig. 6.

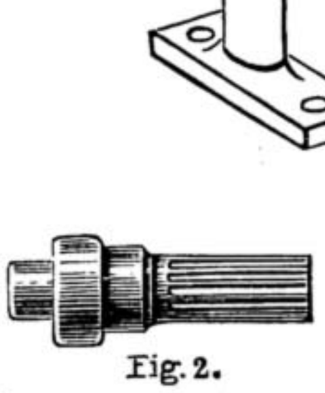


Fig. 2.

Fig. 5.

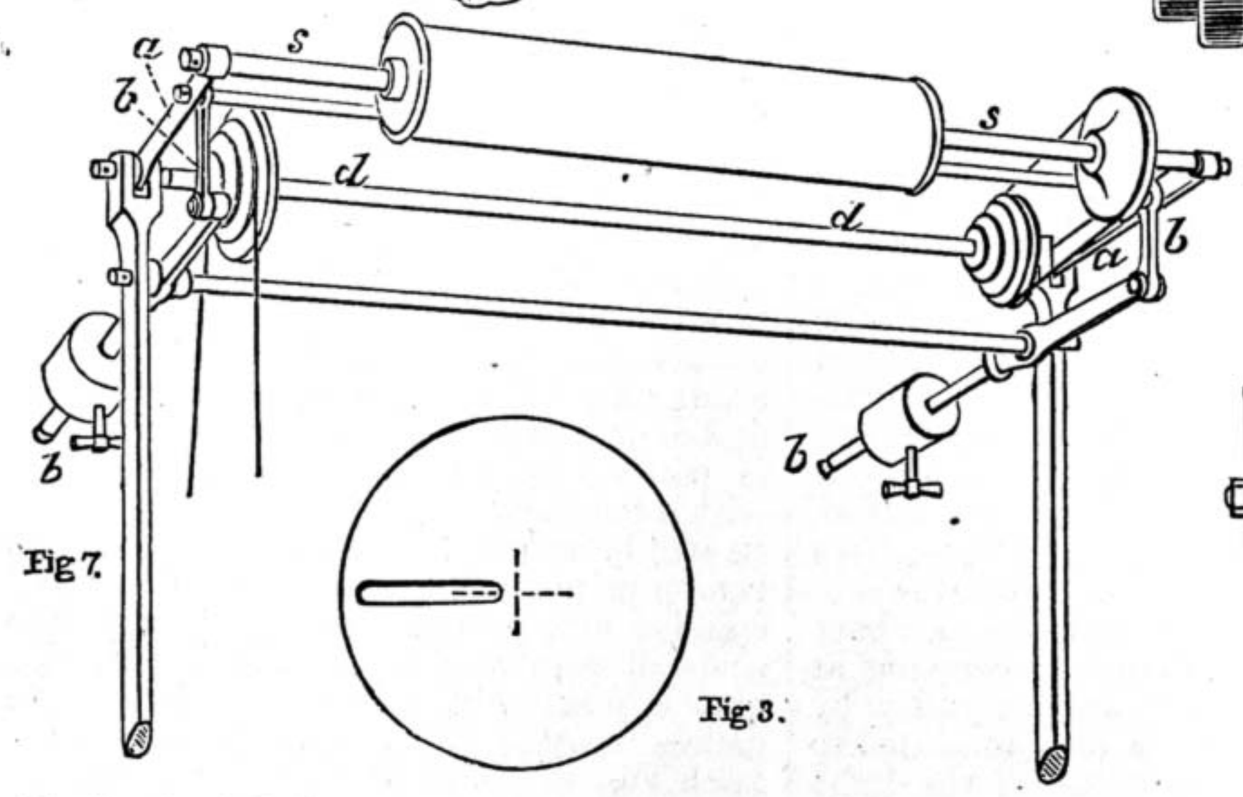


Fig 7.

Fig 3.

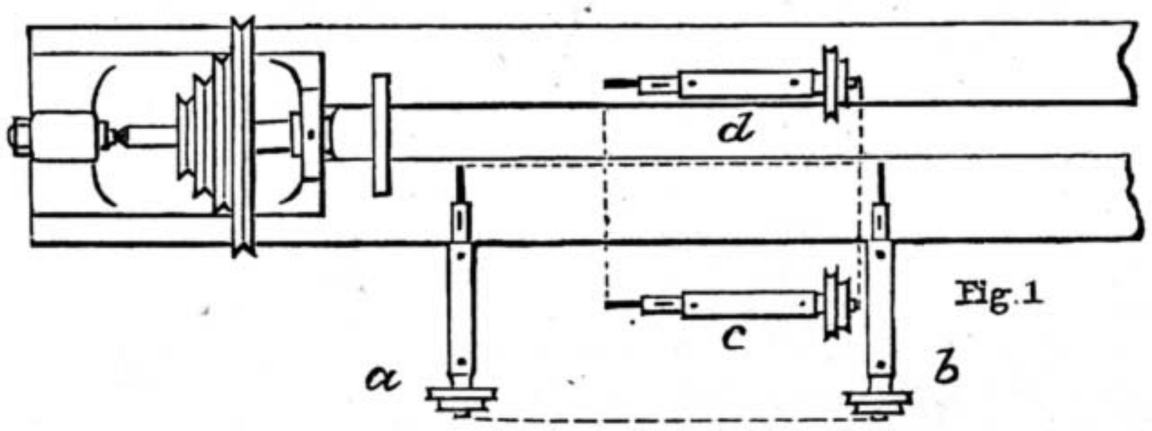


Fig. 1

The Overhead Motion. Fig. 1.—Plan of Lathe Bed with Drilling Spindles in Position. Fig. 2.—Example of Cylindrical Work: Column for Fluting. Fig. 3.—Example of Face Work: Face Plate. Fig. 4.—Overhead by Holtzapffel. Fig. 5.—Overhead by Milnes. Fig. 6.—Overhead by Evans. Fig. 7.—Overhead by Birch and Company.

of this type for his high-class lathes for ornamental turning. The two tightening pulleys are further off than the one pulley of Fig 5, yet the oil may injure work in ivory or white wood.*

Fig. 7 shows a much more elaborate arrangement, by means of which almost all the disadvantages of the former devices are avoided. Except for the extra complication and expense, very little can be said by way of criticism except that the standards are

* Since the above was written, Mr. Milnes has adopted the form shown at Fig. 6.

(To be continued.)

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OUR GUIDE TO GOOD THINGS.

29.—NEW PATENT TOOL-CABINET AND WORK-BENCH.

VIEWED from a purely utilitarian and economic standpoint, it is difficult to conceive any means or to call to mind any article in which the object in view is attained so completely and thoroughly as it is in the New Patent Tool-Cabinet and Work-Bench which was thought out and patented by the head of the firm of Messrs. Richard Melhuish and Sons, 85 and 87, Fetter Lane, Holborn Circus, E.C., and is now manufactured and supplied by the firm for home use and for export.

When closed, the cabinet has the appearance of a handsome piece of furniture, which might, as far as the eye of the observer can determine, serve various purposes for which drawers are generally required. If measured in each direction as it stands, it will be found to be 3 ft. 6 in. long, 1 ft. 7 in. wide, and 3 ft. high, occupying a space of about 16 cubic feet, not to go too closely into its exact contents. When the top is lifted up, and the doors at the sides are opened, its actual purpose is at once revealed; and the observer, perhaps, will be somewhat astonished to see how much has been accomplished in so small a space.

The top of the cabinet, an illustration of which will be found in our advertisement pages in No. 2 (page 31), is recessed and of sufficient depth, not only to contain a considerable number of tools, but also to cover and hide from view, when it is shut down, the small but convenient work-bench that covers in the drawers below. Within the lid are contained a variety of the smaller tools which are frequently required, and which it is desirable to have immediately within reach. Among these are, as will be noticed, a couple of squares, rule, compasses, wrench, spokeshaves, brace, several bits, gas-pliers, gauges, bradawls, gimlets, and a few useful bits for use in the brace. The larger and heavier tools are contained in the cupboards at the sides—room being found in that on the right for a good panel-saw, tenon-saws, bow-saw, hammers, auger, mitre-box, mallet, screw-driver, rasp, and gauges; while on the other side are packed away various planes and other tools, provision being made even for a glue-pot of handy size. The work-bench, which is very nearly 3 ft. 6 in. long, and 1 ft. 6 in. wide, although not very large, is of sufficient size for all practical purposes; although, for large work, a bench of larger size would have its advantages. It is fitted with a patent bench-stop, and a small but serviceable grip vice, for which provision is made in the interior of the cabinet when it is not in use and is closed. The drawers, which are six in number, are fitted up with partitions, and are thus fitted for the reception of carving tools, and other tools necessary for the prosecution of any kind of work which the owner of the cabinet may adopt as a hobby, besides joinery and cabinet making. Thus, for example, room may be found for appliances for fret cutting, a branch of art wood work which finds favour with a great number of amateurs. Provision is made on the right of the front for a peg, on which to support any board or slip of wood, whose other end is gripped and held in the vice, to allow of its edge being planed up. The whole of the six drawers, the two cupboards, and the top, can be instantly closed up and fastened with one small lock and key; which is of great advantage when the owner, perhaps, is suddenly called away in the midst of his work, and yet wishes to leave his tools secure and in safe keeping. "Safe bind, safe find," runs an old saying; and this is as applicable to tools as to anything else which it is desired to keep out of the way of meddlesome intruders.

The tools which are supplied with the cabinet are specially selected, it should be said, as being the most suitable. All are of the best quality, fully warranted, and of full size; precisely the same, in point of fact, as are supplied to practical workmen.

The price of the cabinet, fitted with tools as shown, and made in walnut wood, is £17. It may be made in plainer material; but there is little, if any, advantage gained in using an inferior wood, especially if the cabinet occupies a conspicuous place in an amateur's own room, in which he is accustomed to do any kind of work that would not be permitted in any other room in the house. There is a special form of the cabinet, made for export, to stand hot climates, with solid brass corners, and all parts dowelled and screwed together. This is of walnut, polished, and costs £22 13s. with tools, or £10 12s. 6d. without tools.

Many officers have a fancy for carpentry and joinery, especially of an ornamental character, but occasionally are required to shift their quarters at very short notice, both at home and abroad; and even to go abroad with very little time for preparation. To such as these, the Tool-Cabinet and Work-Bench will not fail to be a most welcome means of securing the prosecution of their favourite work without much trouble or inconvenience in packing and removal. Many amateurs at home will prize it for almost identical reasons, and perhaps more for the *multum-in-parvo* characteristics of the appliance, which enables much to be done in confined space. Lastly, many a professional workman who is cramped for room at home will be pleased with it, because, although he will not dream of becoming a purchaser, it will show him how he may manage to dispose of his tools within the limits of the work-bench itself, and yet always have them close at hand. And this, I know, is a desideratum to many a workman who seeks to help his family and himself by doing an occasional odd job at home out of hours.

I may add that important modifications are being effected in the cabinet, which will render it more acceptable as a piece of furniture, and more serviceable to wood carvers, artists, draughtsmen, and others. Space forbids me to say more about these modifications at present, but they shall be described at a future time when fully matured. THE EDITOR.

SHOP:

A CORNER FOR THOSE WHO WANT TO TALK IT.

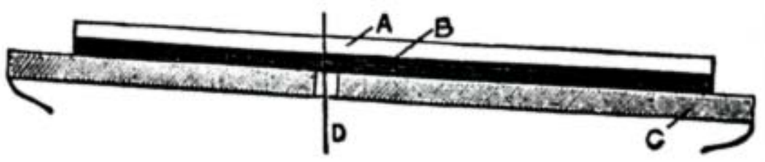
*** *All Communications will be acknowledged, but Answers cannot be given to questions which do not bear on subjects that fairly come within the scope of the Magazine.*

Cost of a Patent.—G. B. B. (*Portsmouth*).—The preliminary expenses of taking out a patent are not very heavy, amounting only to £1 10s., if you yourself take the matter to the Patent Office. If, however, you find it necessary to seek the intervention of an agent, the outlay will be increased, as the agent must, of necessity, be paid for his services. It would not be possible or practicable for us to offer a monthly prize for the best invention out of all that might be submitted to us during each month, the prize to consist of the cost of obtaining provisional protection. Any advice I can give you with regard to your proposed patent is much at your service.

Cutting Rebates with Circular Saw.—C. C. E. writes:—"The circular-saw table should be sloped down towards the operator, about 2 in. below the horizontal, then when raised for cutting rebates, etc., it is not in an awkward position as it would be if made horizontal in its normal position."

Electro-plating and Gilding. — A. W. Y. (*Neasden*).—Instructions on these subjects will be given in WORK in due course.

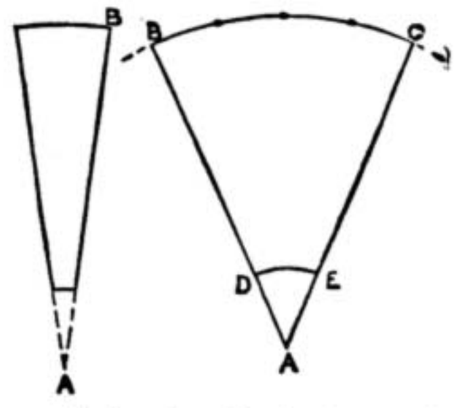
Fret Cutting.—INLAY writes:—"I think it may be useful to some of your readers who are amateur fret workers, and who have fret machines, to know another method of inlaying than the one mentioned by Mr. J. W. Gleeson-White in his article in No. 1



A, White Holly. B, Ebony. C, Tilted Cutting Board. D, Saw.

of WORK on 'A Cabinet in Fret Work.' This method has the advantage of being an easy one, and is, at the same time, a sure way of getting a good result. Say that you wish to inlay a piece of white holly into a piece of ebony, the method is this:—Having your woods of the same thickness, you fasten them together by means of a paper between, gummed on both sides, the pattern being on the holly. Then you tilt your cutting table to a slight angle, and cut with a vertical saw, so that the piece to be inlaid is rather larger than the piece below it, which falls out, and the edges are not quite square, but bevelled, as in the annexed diagram. With a slight force the holly (A) can be driven into the ebony at B, and the piece is inlaid. You then divide the pieces of wood by inserting a chisel and splitting the gummed paper. This method does away with any necessity for a back-board, or of filling up with 'glue and sawdust,' and ensures a perfect fit. Neither is there any trouble about fitting the parts, as each is driven into its place before the woods are divided. It will then stand 'papering,' and even planing, if need be. At the same time, it is all done with one cut. I am sending a sample of what I have done in less than three minutes, and I think you will agree with me that the result is fairly successful. There is no glue about it, as you may ascertain by pressing the back, when the inlaid piece will come out; but, of course, glue should be used for anything permanent."—[The specimen sent was admirably cut, and fitted most accurately in every part. Yet inlayers and marquetry cutters often resort to the mode of filling up chinks and misfits as spoken of by Mr. Gleeson-White. It is a difficult matter to determine where the cutting was commenced—so good is the fit.—ED.]

Scale for Metal Open Diapason.—AMATEUR.—A fair scale for a chamber organ metal open diapason would be as follows:—C, C, 5 in.; Tenor C, 2⅝ in.; Middle C, 1¼ in.; 1 foot C, ⅝ in.; 6 in. C, ⅜ in.; Top G, ⅛ in. Thickness of metal would vary according to its stiffness; but if C, C, is made of metal about 1/16-in. thickness, and top, G, about as thick as a visiting card, it will be sufficient. The feet patterns can be cut out as follows: Having decided on the length of the foot—say 12 in. long—draw a section of it full size, as in diagram herewith, and continue the sloping lines down till they meet in the point A. Then take the distance A to B in the compasses, and strike an arc, B, C. The circumference of a circular pipe is 3⅛ times its diameter, so with the compasses step that distance round the arc, and join the last point thus gained, C, to the point A. Then take the distance from point A to the bottom of the foot, and strike the smaller arc, D, E, and sheet, B, C, D, E, will be the sheet required to form the conical foot of the pipe. This is cut out and turned up on a conical pattern of wood, soldered down the back, and the lip formed by rubbing down on the portion of the cone which has been flattened for the purpose. The lanquid is then soldered in its place and the foot joined on to the body of the pipe.



Handrailing. — EXCELSIOR. — You wish that "some practical reader of WORK would explain the difference between the tangent system and the falling rail system of handrailing, and point out the advantages and defects of each, and also advise a young worker as to what books he should study in order to obtain a practical knowledge of this mysterious art." The tangent system was introduced by an American of the name of Riddell, who wrote two or three works on the subject, which were published in this country. To go into a thorough explanation of the method adopted by Mr. Riddell would take up considerable space, and would prove next to useless to you, because his system is faulty, and involves much waste of material. The falling line system is based on Euclid's "Elements of Geometry," which you should study in the first place in order to get a clear perception of the first principles of the art. Without this you cannot understand the method of drawing sections of solids, and unless you attain to a fair comprehension of this you cannot hope to be proficient as a hand-railer. To give adequate instruction in such a subject as this, which may be regarded as being one of the most intricate and difficult branches of joinery, requires a series of papers, and I am glad to be able to say that I have obtained from a practical handrailer of nearly forty years' experience a promise to write some articles on the subject in which the falling rail system as practised by himself shall be fully explained for the benefit of yourself and all readers of WORK who may be interested in the matter. This writer will prepare models one-fourth size, which may be obtained at small cost, comparatively speaking, and will show practically how handrailing may be executed in the most economical manner, and the least possible expenditure of material, time, and labour. He is prepared, further, to teach the art of handrailing as practised by himself to any young workman who might be able and willing to place himself under his tuition for a short time.

Printing and Lithography.—J. D. (*Perth*).—Both subjects will be treated in due course. Meanwhile, if you and your friends will mention any particular thing connected with either art on which you may be in doubt or difficulty, you shall be helped if it be possible to do so. Do not hesitate to write, for it is earnestly desired to afford help to all who need help.

Carpentry and Joinery.—A. H. S. L.—Arrangements are pending for a complete series of instructions on carpentry, joinery, and cabinet making. I should recommend you to wait for these.

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Spots on Mirror.—W. C. T. (*Ardgowan*).—You ask how to remove spots from the back of a mirror, which, you think, have been caused by damp. These spots you describe as "circular with black centres about ¼ in. in diameter shading off to grey." Looking-glasses are silvered with quicksilver and tinfoil, which combine to form a fragile coating easily susceptible of damage. Possibly the spots on your mirror are numerous, and, if so, the best course you can adopt is to have it resilvered. It is said that damage to the silvering of a looking-glass may be repaired by first removing the amalgam from the injured part, and making a wall of beeswax round it to receive some nitrate of silver, which must be poured into the shallow receptacle thus made. The silver must then be precipitated by means of sugar or oil of cloves and spirits of wine. But to do this to every spot would be a troublesome business even if you were successful, so it would be better and easier to resilver the whole plate. Kindly give particulars of the Patent Darning Weaver you mention in your letter.

Telephone.—H. B. O.—Yes; a paper, or papers if necessary, will be given on the telephone and its construction, but it is not possible to do everything at once. If everything was done, or could be done, to-day, there would be nothing left to do to-morrow.

Working Marble and Stone.—DEAN FOREST.—I am not acquainted with any book that is devoted to an exposition of cheap sculpture likely to be useful in grave-stone making. Tools and appliances for cutting and dressing stone may be obtained of most dealers in tools and hardware. They are chiefly saws for cutting blocks into slabs, and mallets and chisels for dressing and cutting letters. If you are a novice seeking to gain some knowledge of the art, any stone mason would tell you what is required for the manipulation of the stone, and how the work is done; but for the higher branches of the art you would have to seek the assistance of the monumental mason, who devotes himself more particularly to this kind of work.

Electricity.—J. G. (*Portsmouth*).—You will find that electric lighting, bell work, and instrument making with sketches and working drawings will form a prominent feature in WORK. A contributor is now at work on a series of articles on Burglar Alarms, showing how to protect the house against the intrusion of burglars in the most simple but most effective manner.

Wire Thread Fret Saws.—B. and S.—As I explained in my notice, these saws are not yet on the market. As soon as they are on sale, the sizes in which they are made, and the prices at which they are sold, will be announced in this Magazine.

Violin Making.—B. and S.—This subject is down for treatment, but there is neither space nor opportunity for going into it immediately. If you require assistance on any special point in connection with violin making, write, and your question shall be submitted to one who is skilled in the business.

Mixing Paints.—F. A. (*Lambeth*).—This will be fully explained in articles bearing on House Painting, and possibly a paper or two may be devoted to this specially describing the mode of procedure to be followed at an earlier date than it would be possible to enter on a consideration of house painting. Moreover, it would be of assistance to many in enabling them to better understand some papers that will appear at no very distant time on a new mode of decorating surfaces with oil colours.

Sheet Metal Working.—W. H. L. (*Crewe*).—An experienced worker in sheet metal is now about to prepare a series of papers on the business in which you are engaged, and they will be commenced as soon as opportunity offers.

Joinery and Cabinet Making for Beginners.—H. D. (*Bury, Lanc.*).—You ask for a series of papers on articles that can be made with about three shillings' worth of tools, and wish me to say what tools it would be best to buy with that money. You continue:—"By small articles I mean those that can be sold at a little profit so as to get more money, and therefore more tools. If you could state what they would cost and what they would sell for, I should be very thankful." I should very much like to hear more about yourself; that is to say, how old you are, and how you are employed, for you are evidently bent on doing the best and utmost you can on a very slight amount of capital. Now, if I am not very much mistaken I think there will be help in store for you, and that some of the readers of WORK, whose eyes light on this, will send you an odd tool or two that they do not want, to help you make up a kit of the most necessary articles. But supposing that nothing of this kind were forthcoming, I should advise you to commence with fret sawing, and buy a bow saw frame and a few saws, a piece of wood, and a simple pattern of a bracket or tray, or some article that is quickly and easily made. You will want nothing in addition to the fret saw beyond a light hammer, a fine bradawl, and a few fine brads or French nails wherewith to fasten the pieces of fret work together. With regard to the price you are to ask for any article that you make, it is difficult to advise you. Things in fret work are sold in fancy goods' shops at prices ranging from sixpence upwards, and supposing at first you were to ask for each article twice as much as the materials cost you, you would get back the cost of the materials, and as much again for labour, and with this you could buy more materials, and, after a bit, more tools, as money begins to gather a little. Always bear in mind that excellent advice or rather injunction, "Despise not the day of small things." Practically you are laying this to heart and acting upon it, and although I am far from being "among the prophets," I dare venture to say that with your spirit, combined with patience and perseverance, you cannot fail to succeed, God permitting. Let me hear from you again, for I can assure you I take a deep interest in your proceedings, and the doings of all such as yourself. If it be possible to introduce a few papers describing the mode of making a few small articles that may be quickly and easily made for sale, you may rest assured that it shall be done in order to help you and all others who show so earnest a will to help themselves.

Power Loom.—J. A. A. (*Manchester*).—You ask if it be possible for me to devote a portion of WORK to the construction of the power loom with wheel calculations, etc., adding that it would be of great service to scores in Lancashire, and make WORK doubly valuable in that county. I am glad to say that I am in communication with a contributor who is prepared to write on the construction of both the hand loom and power loom, and so it will not be very long before the desire of yourself and others is satisfied. There are emigrants from the old country in Manitoba, and elsewhere in the colonies, who have plenty of the raw material, but want the means of spinning it into yarn, and then weaving it into stout homespun material for clothing, and so, you see, there is abundant reason for moving in the matter as soon as may be, in order to meet their wants and yours. Write again and explain to me how the knowledge of the *construction* of the power loom, etc., "would be of great service to scores in Lancashire." Is it sought in order to lead up to better work, or to the making of looms?

Cabinet in Fret Work.—T. F. (*Willington-on-Tyne*).—The wood is too thick to give the required effect. The thinnest veneer—2-ply if possible, or a thin 3-ply—should have been used. This, with plentiful rubbing down with sand paper, would have avoided the result in your case, which is certainly disappointing. Your kindly expressions regarding the design itself are welcome, and the designer is sorry the first worker found obstacles in the way. Whether it would be possible to fill up the spaces cut out with any composition to obtain the effect of inlay seems doubtful. Yet the honour of being the first to use No. 1 is not marred by the failure, and we shall always recall the effort, and remember the name of the first reader who recounted his experience. (J. W. G-W.)

Hand Circular-Saw Benches.—A. R. (*Scorrier*) writes:—"These machines are very useful in joinery works or saw mills, where there is motive power to drive them, as they will do work that cannot be done by frame or band saws, such as grooving, rabbeting, etc., and will cut rafters, staves, laths, etc., with greater despatch than any other kind of saw. But how often do we see timber presented to such machines that should not be. I believe some employers think if they have a circular saw at work that it and the man that has to work it are capable of cutting almost any depth of timber with it. This is a great mistake, and one, I think, that should be looked into by our Government Inspectors. How often have we seen a man at a saw bench trying to push a piece of timber from 9 in. to 16 in. deep against a circular saw. He will push it 2 or 3 in., and then through overfeeding, or through being unable to push any farther, he has to stop. After a pause he pushes an inch or two farther, and so on, until he pushes through the cut, doing the saw no good, and himself harm. There are benches made with rope roller and rack feed to bring the timber to the saw, and all benches in which saws are being worked above 24 in. should have one of the above appliances. Again, when a man has to push a piece of timber above a certain depth he is obliged to stand behind the timber, and directly in front of the saw, and should the timber close or catch the back of the saw it is liable to be flung against the sawyer; therefore, you will at once see the man is in a dangerous position. Had the bench either of the above feed motions the man could stand by the side of his work and near the saw bench, and be near at hand to stop the saw or the feed should it be required. Shallow and short stuff, such as laths, staves, etc., requires but little power to push or feed it, therefore the sawyer may stand on one side, and not put himself in such danger as if directly in front of the saw. As WORK is a new paper, no doubt many will avail themselves of writing to it, therefore I will take up no more space in this number, but, with the Editor's permission, will write more on saws in future numbers." [The pages of WORK are always open to workmen on any subject connected with their trade, and I have much pleasure in inserting your communication, which, I trust, will lead to the adoption of the course you advocate with circular saws that are used to cut wood of considerable thickness.—ED.]

REPLIES to the following correspondents are held over for want of space:—H. D., W. J. B., J. G., F. A., J. C. (*Aberdeen*), J. D. N., E. P. W., SARA, H. T. C. (*Leytonstone*), A NOVICE, PROGRESS, MECHANIC, W. H. (*Liverpool*), F. S. (*Newcastle-on-Tyne*), C. L. (*Uxbridge*), G. E. D. (*Liverpool*), W. G. P. (*Fenny Stratford*), G. W. (*Liverpool*), A COTTAGER, H. D. (*Haverfordwest*), H. S. (*Bebington*), A. R. (*Scorrier*), W. T. (*Leyton*), H. W. (*Gateshead*), NULLI CEDO, H. S. (*Exeter*), F. F. (*Peckham*).

Trade Notes and Memoranda.

THE first Exhibition of Blacksmiths' Work, under the auspices of the Worshipful Company of Blacksmiths, was held towards the close of March, 1889, in the Hall of the Ironmongers' Company, in Fenchurch Street. The exhibition of the work of the journeymen and apprentices of London was a small one, the number of contributors not exceeding thirty.

SOME TOPICS OF THE HOUR.—The Registration of Architects.—Fireproof Floors.—The Utility of Local Museums.—Architects' Fees.—English *v.* Continental Doors.—The Shaftesbury Avenue Architecture.—Trade "Discounts," alias "Commissions."—The Restoration of Westminster Hall.

PATENTS have been applied for in fireproof wall and ceiling papers, for drawing the outlines of objects and scenes in correct perspective, brick ovens for bread baking, moulds for pressing bricks, etc., and for improvements in glazed structures.

THE Society of Arts has guaranteed £100 towards the Autumn Exhibition of the Arts and Crafts Exhibition Society.

"SECONDARY BATTERIES" will be the title of a lecture by W. H. Preece, F.R.S., before the Society of Arts on an early date.

SHIPBUILDERS continue to be well employed upon the Wear, and there are about 10,000 tons of shipping on the stocks and in the water in excess of what there was at the beginning of the year, the output for the last three months being in excess of the corresponding period of 1888.

THE iron trade of Dudley is well maintained. There is a good demand for tin plate and sheet iron, and manufacturers of boiler plates are fully employed.

ENORMOUS quantities of goods are being sent out from the Boot and Webbing warehouses of Leicester.

THE method of lighting the channels of harbours by means of electric buoys, which has been tried in New York Harbour, is likely to be adopted in this country, as it has been favourably reported on by officers appointed to examine the system.

THE following is a formula for a wash for lime walls, so as to bear washing. Mix the powder from three parts silicious rock (quartz), three parts broken marble and sandstone, also two parts of burned porcelain clay with two parts freshly-slaked lime, still warm. The four constituents mixed together give the ground colour, to which any pigment that can be used with lime is added. It is applied quite thickly to the wall or other surface, allowed to dry one day, and the next day frequently covered with water, which makes it waterproof. This wash can be cleansed with water without losing any of its colour; on the contrary, each time it gets harder, so that it can even be brushed, while its porosity makes it look soft. The wash or calcimime can be used for ordinary purposes, as well as for the finest painting. A so-called fresco surface can be prepared with it in the dry way.

WORK

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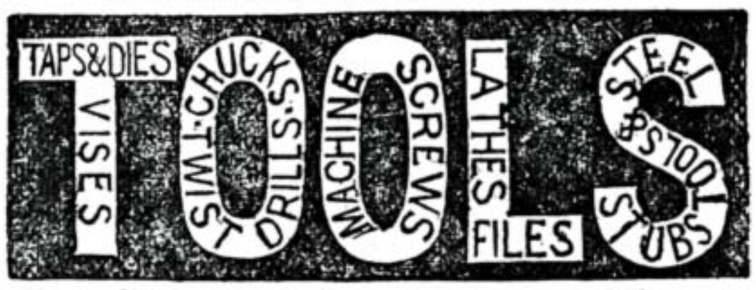

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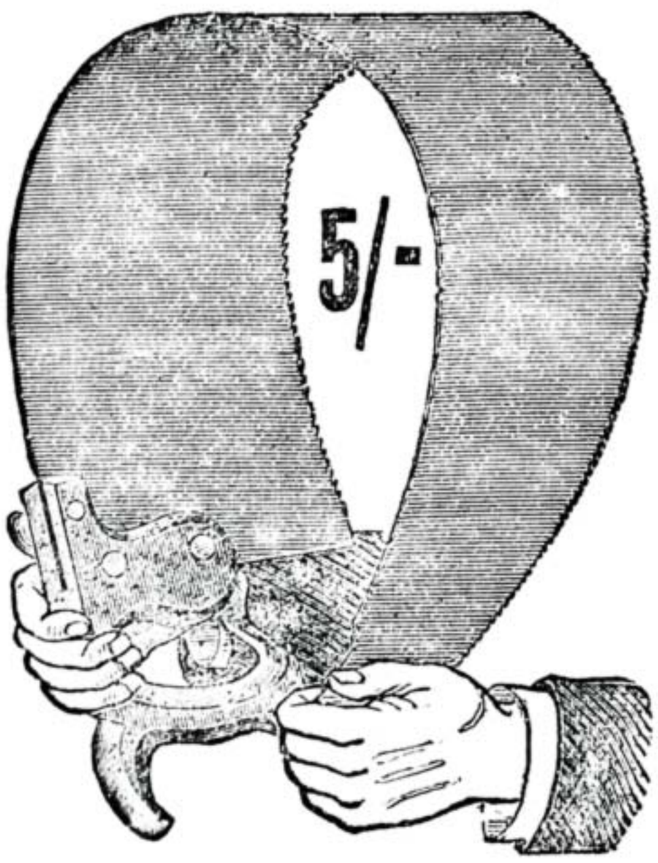

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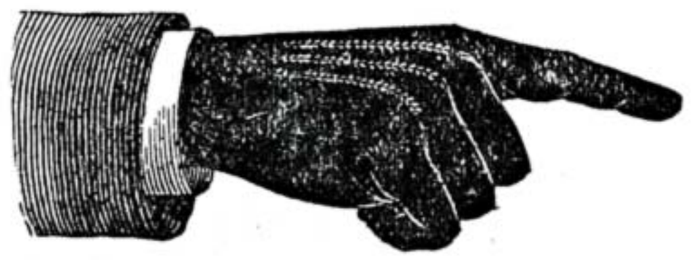

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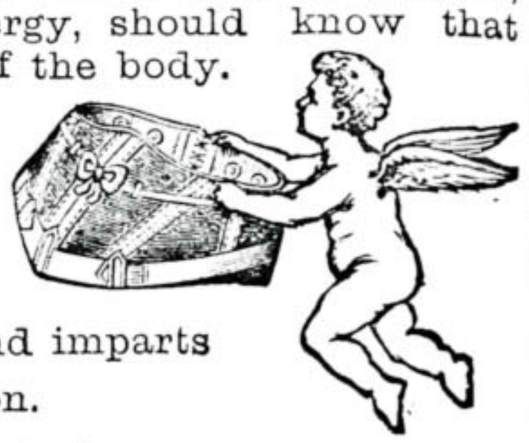

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